MACWORLD

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The Macintosh™ Magazine

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- Network Choices
  Pros and Cons
- LightspeedC
  Cheap–Easy–Fast!
- Plotter Power
- Exciting Advances
  Mac in the Lab
- Reviews!
  Insight, Micro Planner Plus, Acta, Graphics Magician

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- Arms you with a report generator that prints out your mailing lists, calendar, or phone directory.
- Tells you the time with a sweep-hand analog clock.
- Gives you instant on-line "Help" with one mouse click.

Heart of America's skipper Buddy Melges with *Borland International's* skipper Philippe Kahn on a testing, training, and analytical run, Santa Cruz, California.

Mac News for Kangaroos!

Heart of America, one of the U.S. 12-meter contestants in the America's Cup races in Australia, is relying on Reflex for the Mac to help *Bring That Cup Up.* (They're also using Borland's SideKick® and Turbo Pascal.®) Reflex analyzes 20 different variables like *wind speed, heel angle, backstay load, trim tab angle, rudder angle* and 15 other criteria to show and tell *Heart of America* where to be when—and what to do now to win!

NEW

Turbo Pascal for the Mac coming November 15!

The incredibly fast (more than 12,000 lines a minute) Turbo Pascal for the Mac™ is about to be released. It will be priced at only $99.95, and includes a complete development environment with a built-in editor and the ability to run programs *and* generate *double-clickable* programs *while you run* the lightning-fast compiler! (You can also do separate compilations using UNITs.)

We've also made the compiler fit into 48K. Small, powerful and fast is beautiful.

Borland's Turbo Pascal for the Mac is compatible with Lisa® and Macintosh™ Programmers' Workshop Pascal.

Turbo Pascal for the Mac is even better than the current Turbo Pascal version we have for the IBM®PC, but don't tell anyone. November 15 is soon. Get Turbo Pascal for the Mac—don't settle for anything less!

Introducing Reflex for the Mac, Borland's remarkable new relational database

Because it is a truly relational database, Reflex for the Mac™ lets you get your various acts together. Lets you connect "A" to "B" to "C," or "Dog" to "Cat" to "Fight." Or whatever links and connections you need to make and need to see. It's a simple spreadsheet-style series of electronic and visual cross-references. There's a clear connection (which you first make by drawing it on-screen) between "Client"—"Matter"—"Attorney"—"Time Sheet"—"Expenses" and "Bill." Or between "Slow Driver in Left-Hand Lane"—"Mile-long Traffic Jam" and "Shot from Behind." It's all relational.

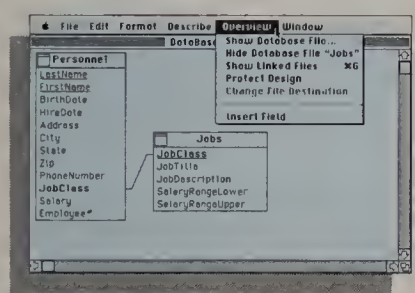
Designed to make the most of your Mac's visual talents, Reflex for the Mac lets you place fields and pictures wherever you want them on the page—and print them that way with your Report Generator.

A funny way to use Reflex for the Mac

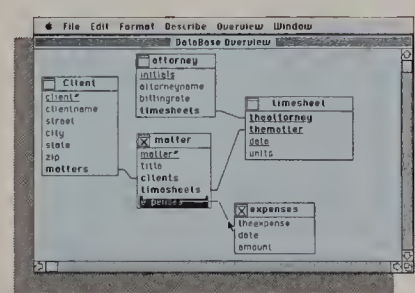
Let's say you have to make a lot of speeches and you like to tell jokes, but can't always remember the right one for the right audience at the right time. So you use Reflex for the Mac to set up multiple files that all connect to each other.

Your "Joke" file connects to your "Audience" file, which is split into categories like "Friendly," "Hostile," "Dumb," "Student" or whatever—all of which are interconnected and relational. Reflex for the Mac lets you find the right joke for the right audience, right now.

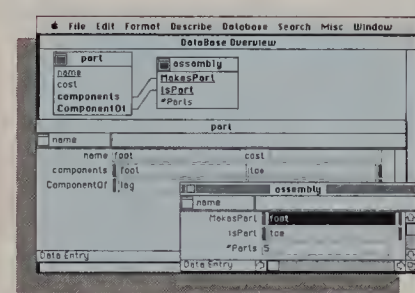
(The serious sides of business include applications like client billing, stock portfolio management, tax planning, and your checkbook.)



After opening the "Overview" window, you draw link lines between databases directly onto your Macintosh screen.



The link lines you draw establish both visual and electronic relationships between your databases.



You can have multiple windows open simultaneously to view all members of a linked set—which are interactive and truly relational.

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Philippe Kahn,
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MACWORLD

October 1986 The Macintosh™ Magazine

Getting Started

96 **The Power behind the Plotter**
Prasad Kaipa and Edwin Haskell
A pen plotter is only as good as its driver. Learn how plotter drivers work and take a look at the latest batch for the Macintosh: *MacPlots II, MacPlot, Plotstart,* and *Plot-It.*

Review

104 **A Network Divided**
Jim Heid
Share the wealth of hard disk storage and exchange data with ease using distributed network software. Reviews of *MacServe, TOPS,* and *HyperNet.*

112 **Microsoft's New Works**
Danny Goodman
While you work your way up to more powerful programs, let this very workable integrated package be your productivity workhorse.

118 **C in a New Light**
Jim Takatsuka
Discover the unified theory of C programming. *LightspeedC* combines a multiwindow text editor, a linker, and utilities into an integrated environment that lets you write and test code with relative ease.

122 **Insight**
Keith Thompson
A graceful user interface, sophisticated reporting features, and power to spare make Layered's *Insight* the high-end accounting package to beat.

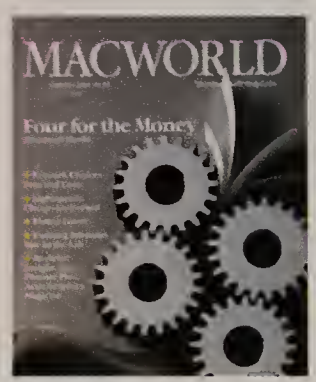
Hands On

126 **The Ins and Outs of Interlace**
Laurie Flesher
Two dozen tips for faster, more efficient operation and better-looking reports.

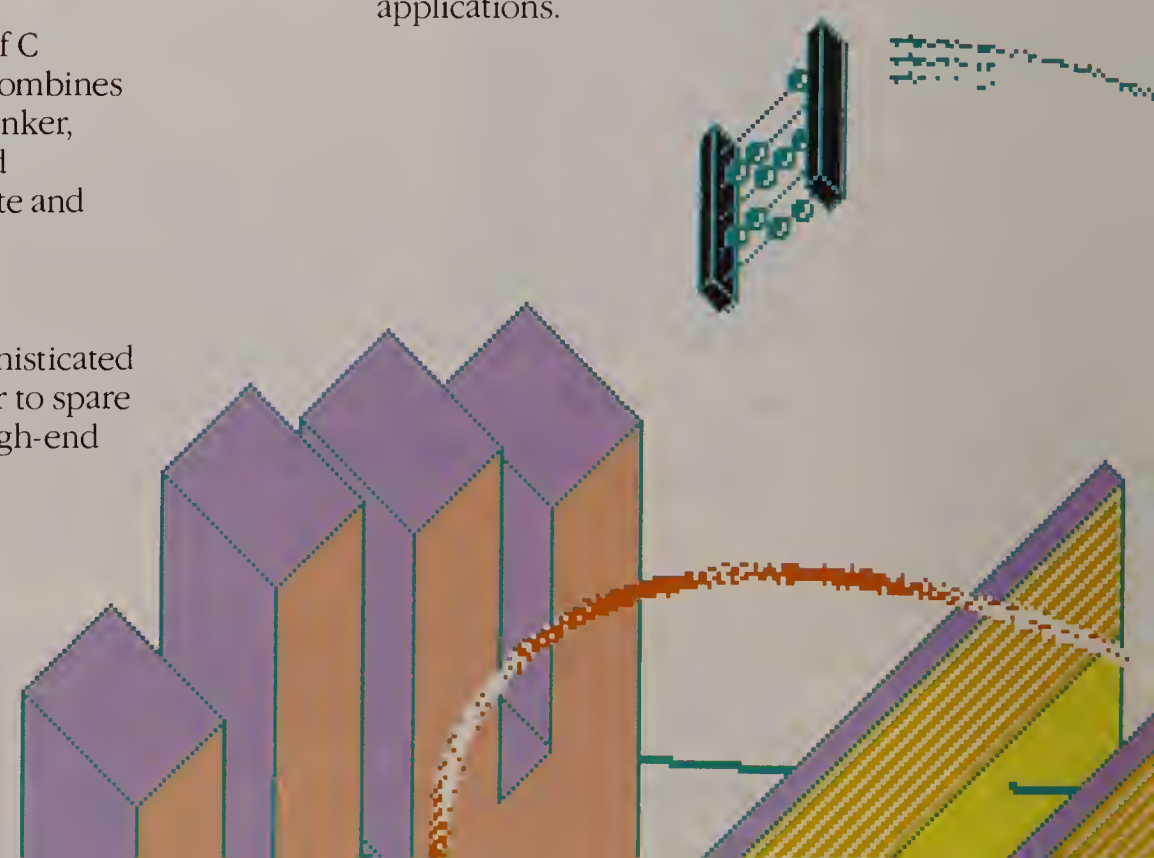
130 **Keys to the Future**
Nanci Hamilton Reel and Christopher Osburn
Are you still using a keyboard layout designed over 100 years ago to slow down speedy typists? Break out of the nineteenth century by converting to the speed-optimized Dvorak layout.

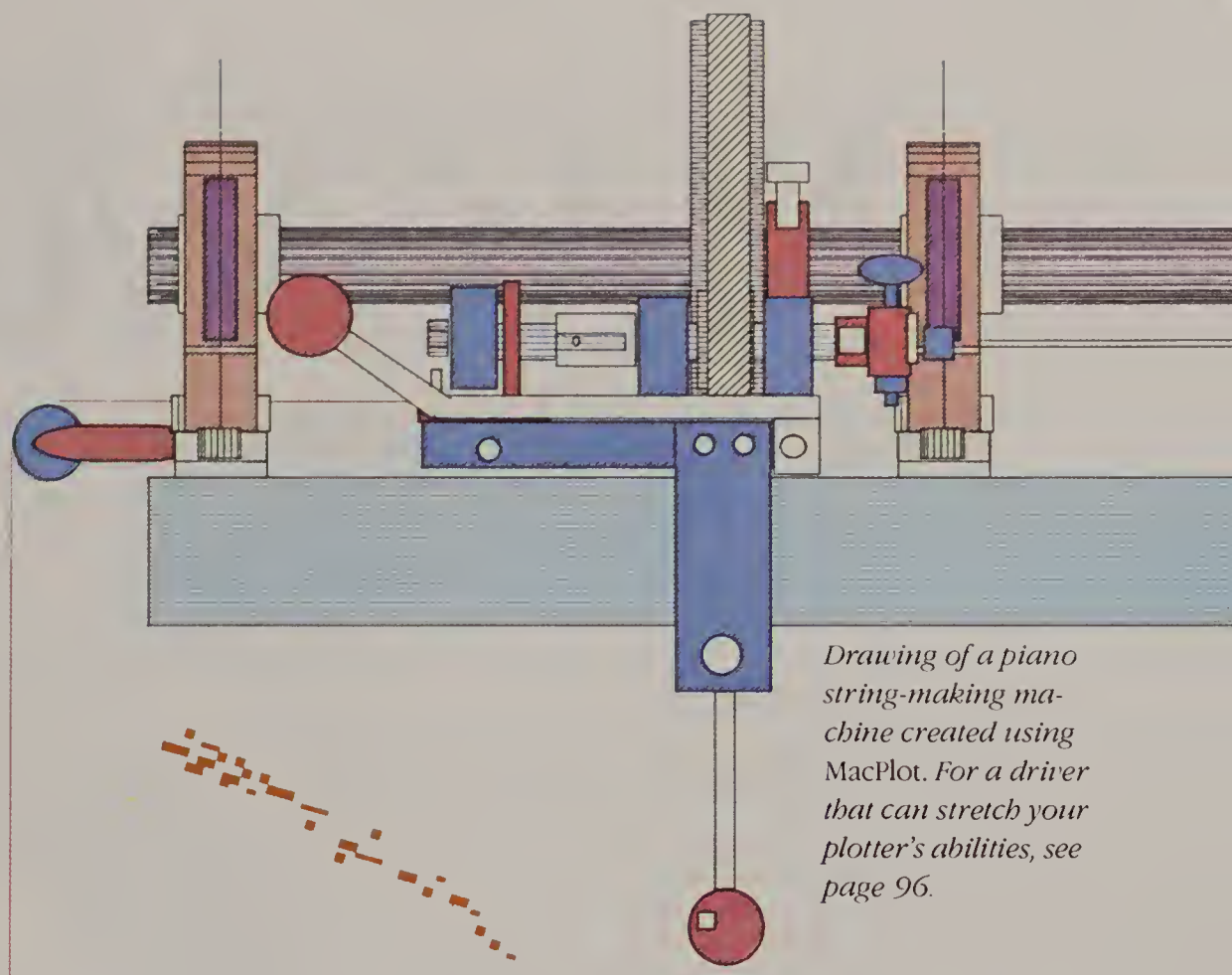
Community

136 **The Labtop Macintosh**
Dan McNeill and Paul Freiberger
It's no longer an experiment: from data acquisition and instrument control to biological modeling and molecular diagramming, the Mac is getting results in scientific applications.



On the Cover
Put your Macintosh in gear with Microsoft's new integrated package. See page 112.





Drawing of a piano string-making machine created using MacPlot. *For a driver that can stretch your plotter's abilities, see page 96.*

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David Bunnell

27 **What Do Macintosh Users Want?**
Jerry Borrell

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Steven Levy

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65 **Macworld View**
A look at *Servant,* details on the new Apple II, *dBase* comes to the Mac, an Apple support group for programmers, and more.

79 **Get Info**
Lon Poole
Macworld's tutor answers questions about printing envelopes on the ImageWriter, the Finder versus the MiniFinder, RAM disk difficulties, and other Macintosh concerns.

143 **Macware Reviews**
- *Word Handler* A new alternative to *Word* and *Write.*
- *Micro Planner Plus* A project manager for people with big plans.
- *Acta* If you agree that an outliner should be an adjunct rather than an application, consider this handy desk accessory from Symmetry.
- *ColorChart* A color graphics program that's low on the price spectrum.
- *The Graphics Magician* Add a little action to your programs with this animation application.
- *Turbo Maccountant* A full-featured accounting program with an agreeable bottom line.
- *Evelyn Wood Dynamic Reader* and *Smart Eyes* Quick scans of two speed-reading packages.
- *Softstrip* The biggest thing since bar code or a concept without a constituency?
- *Mac + II* Run (or is it walk?) Apple II software on the Mac.

179 **Open Window**
An exchange of Macintosh discoveries, including three *Excel* macros for scientists and statisticians, tips on undocumented Microsoft BASIC features, and pointers on using *Tempo* and *MacTracks* to print multiple copies of *MacPaint* files.

171 **Macworld Directory**

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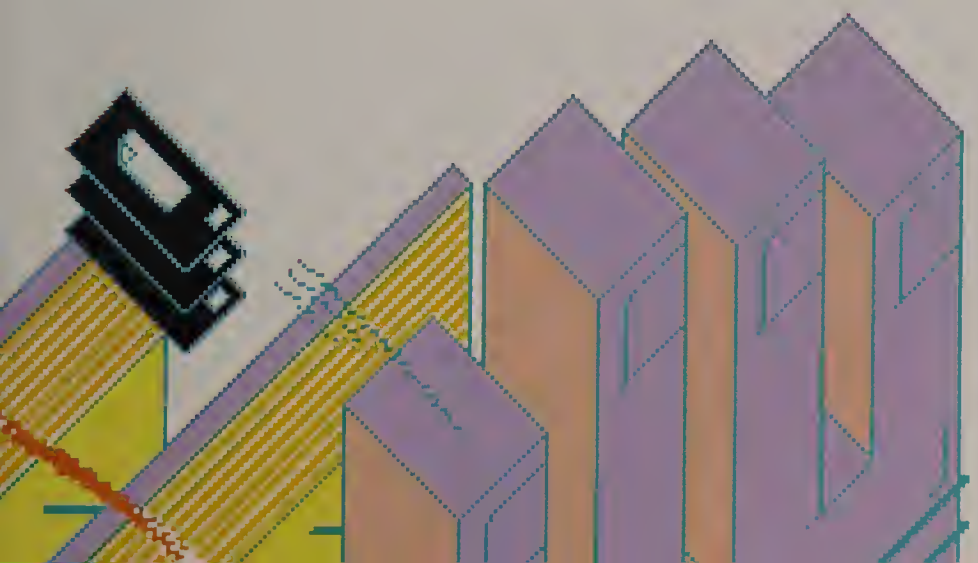

Two-headed Mac: Radius's full-page display lets you use the Mac's screen at the same time. See Macworld View *for details.*

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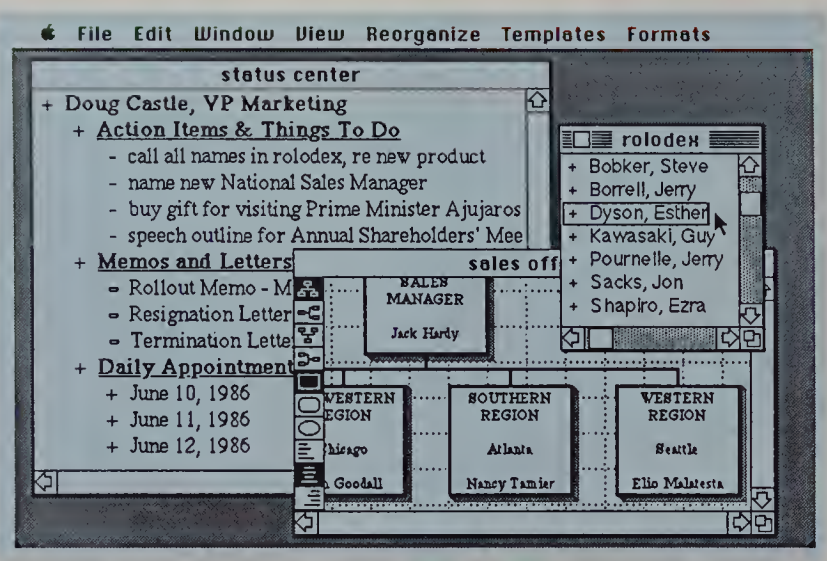

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- *window tiling – horizontal, vertical or diagonal*
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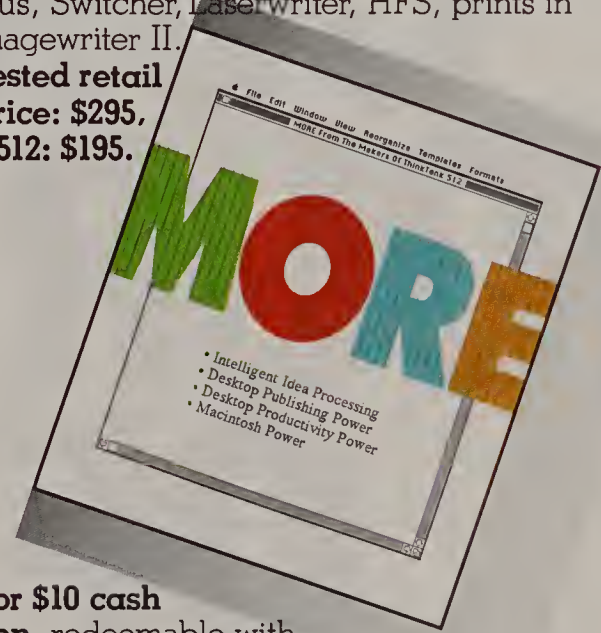

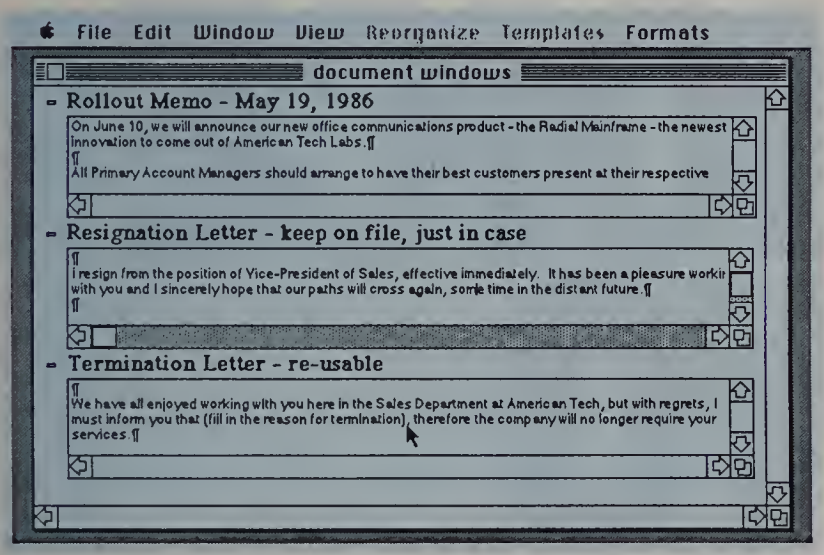

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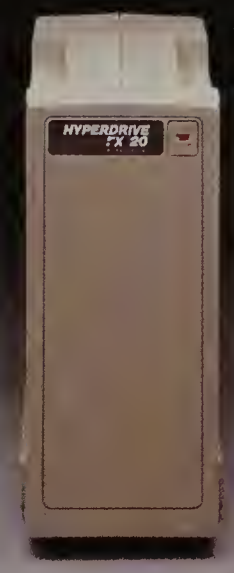

THE NEW HYPERDRIVE FX/20 EXTERNAL HARD DISK.

INTRODUCING HYPERDRIVE FX/20.

When General Computer introduced HyperDrive, it set performance standards that remain unmatched by all but succeeding HyperDrives.

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But unlike other external disks, HyperDrive FX/20 brings both speed *and* sophistication to the management of information.

A program called Backup, for example, lets you quickly make back-up copies of your files onto diskettes—and even checks to make sure each copy matches its original.

A print spooler program lets you use your Mac for other documents even while your LaserWriter is still busy printing the one you just finished. And it reduces by up to 90% the time you might otherwise have to wait.

A security program protects your files from unauthorized entry. It scrambles data so that it's indecipherable to everyone who doesn't know the password you assign it.

The FX/20 also *stores* information intelligently. Its 20-megabyte capacity accommodates the data that would otherwise occupy up to 50 diskettes. Files are structured hierarchically. So your data is dynamically stored and retrieved, and you don't have to partition the hard disk.

In short, with the FX/20, as with the Macintosh itself, elegance is more than cosmetic; it is designed into the system, and measured by functionality rather than just appearance.

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HyperDrive FX/20 arrives with the paradoxical advantage of being both new and proven at the same time.

Its software has been proven on previous HyperDrives. And its overall reliability is perhaps best summed up in the fact that HyperDrive is the largest-selling Macintosh peripheral in the world.

It's also backed by a ninety-day limited warranty and over 1200 authorized General Computer dealers nationwide. Additional serenity is available in the form of an optional service program (HyperCare) that lets you extend your coverage almost indefinitely. (See your local dealer for complete details.)

So if you prefer an external hard disk, you no longer have to settle for performance beneath the standards of HyperDrive. And if you prefer an internal hard disk, that issue was resolved in favor of HyperDrive some time ago.

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David Bunnell

A Tale of Two Systems

Once the whole world of personal computers seemed to orbit around IBM. Now it's unclear who's orbiting around whom.

'While IBM moves toward a closed system, Apple moves to open up the Mac.'

Somewhere in a distant personal computer galaxy, a new star is being born. In the meantime, back here on earth, we're being pelted by meteorites the size of IBM PC clones.

It's been almost a year since Apple president and CEO John Sculley issued his prophetic warning to the gurus and moguls of personal computing gathered at Esther Dyson's annual forum in Phoenix to discuss the shape of the PC universe.

A serious consequence of sweeping MS-DOS standardization, Sculley cautioned, was that South Korea, Taiwan, and Japan would flood the United States with low-cost, high-quality personal computers and dominate the PC-compatibles marketplace.

No one at the conference took him very seriously. The personal computer industry leaders agreed that only one standard existed—namely, MS-DOS—and that anyone who wanted to be a force in the industry would have to conform to that standard.

This prompted another warning from Sculley. "Industry standards that don't allow for future innovation will end up stifling the industry's growth instead of regulating it," he reminded them.

But Compaq Computer president Rod Canion and others argued that the MS-DOS standard actually promoted rather than inhibited creativity. They maintained that staying within the standard would free you to do anything you wanted, while ensuring your software's compatibility with whatever machines were dominating the PC world.

The consensus was that Apple had positioned the Macintosh to be a factor in the corporate world—like the IBM PC—and that the attempt had failed miserably. I remember a moment during the conference when someone actually remarked, "Apple is dead but doesn't know it yet."

In session after session, speakers repeated the doomsday forecast for Apple Computer. They insisted that once the *Microsoft Windows* interface for the PC was released, the Macintosh—with its words-and-graphics sophistication—would lose its temporary advantage over the PC.

Once *Windows* was available, they claimed, there would simply be no reason to own a Macintosh.

Well, *Windows* has been released, and the Mac is doing better than ever. It's now clear that if *Windows* does make an impact, it will largely be on the faster 286- and 386-based PCs: *Windows* requires more speed and more memory than the standard PC provides. Even with an accelerator board, *Windows* seems very slow.

It's also apparent that *Windows* on a PC doesn't yet compete all that well with a Macintosh, because the Mac's screen resolution is far superior to that of the IBM PC.

Eventually, *Windows*-based machines will indeed rival the Macintosh. But because *Windows* demands faster processing and more memory, there won't be enough *Windows*-based machines to constitute a real threat to the Mac for at least another year. And when this point is reached, the machines will probably be much more expensive than the Mac-based systems.

Microsoft chairman Bill Gates recently told me that "the Macintosh will be the

(continues)

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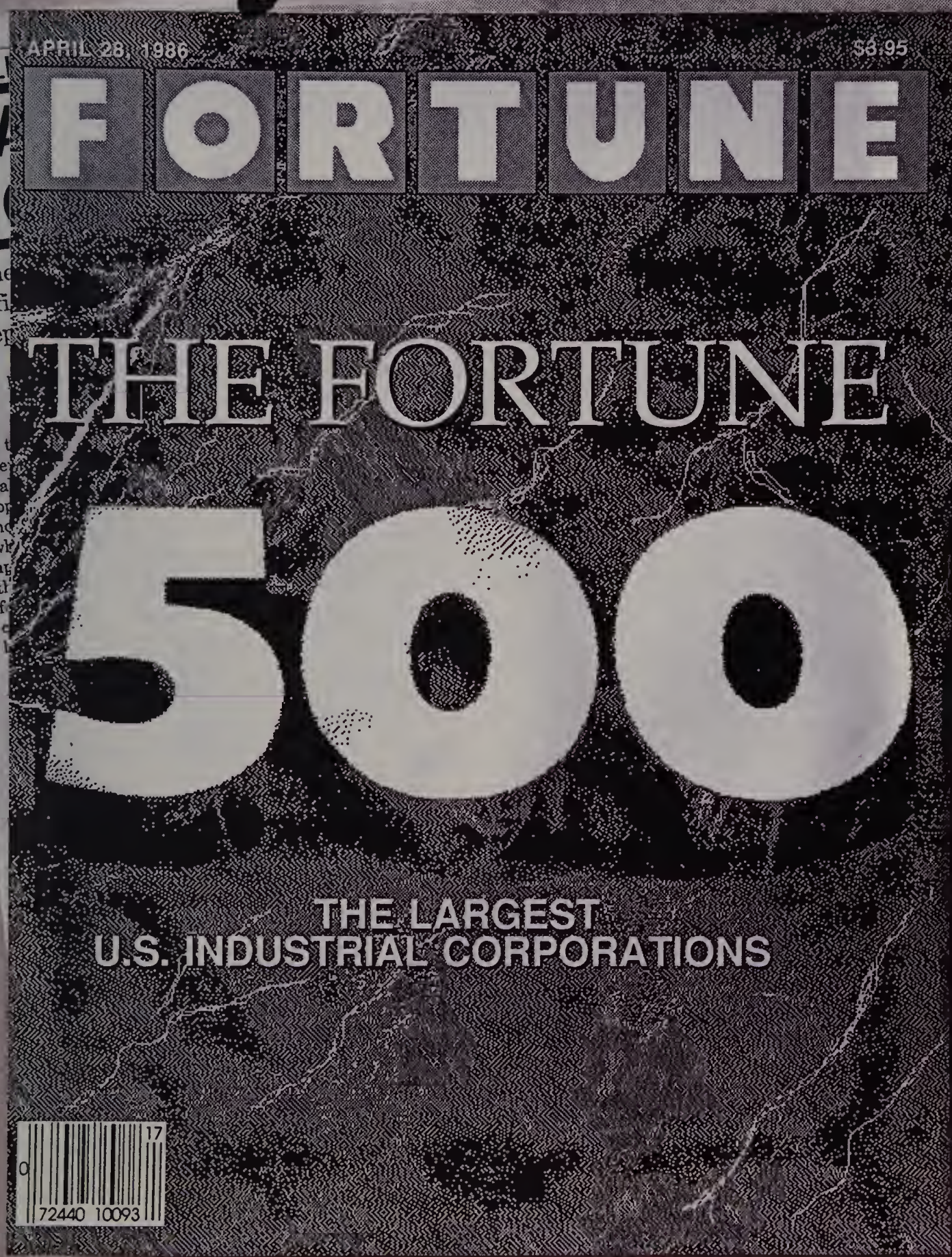

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low-cost alternative for graphics-based personal computers."

Meanwhile, the Macintosh has shown tremendous improvements in speed, performance, and software. And since it's based on a proprietary system that has yet to be successfully cloned, Apple can command healthy profit margins. In fact, Apple owns the whole Mac market, while IBM has only 40 percent of the PC market. And Apple has more than $600 million in the bank.

IBM, on the other hand, has witnessed a dramatic change in its fortunes. Because of competition from the clones, IBM has lost its hold on the MS-DOS world. Once reigning supreme, lately IBM has seen its power eroded not only by low-cost imports from Asia but by homegrown clones right here in the United States.

At the Phoenix conference IBM may have been touted as invincible, but here we are, less than a year later, asking the question, Will Big Blue ever regain the position it once held in personal computing?

The prospects are bleak indeed. Ironically, IBM is about to embark on a strategy of making its future computers less clonable and more proprietary—probably with methods similar to those Apple used with the Macintosh, such as placing routines that draw text fonts and display graphics in a proprietary ROM.

While IBM moves toward a closed system, Apple plans to open up the Macintosh.

At this point, Apple has the advantage because it stands to benefit from the lesson of IBM's trials in the world of compatibility. Thus Apple can incorporate all the benefits of open architecture while avoiding the pitfalls that have befallen Big Blue.

By putting in slots that will accommodate third-party circuit boards, memory boards, and interface boards, Apple is encouraging the creation of different Macintosh configurations that otherwise might not have come about.

I predict that in the not-too-distant future we will see an explosion of diversely configured Macintoshes on the market. These machines will be loaded with different kinds of internal boards and configured to a wide variety of input and output devices.

However, despite the open Mac, Apple is unlikely to simplify the Macintosh's ROM

(continues)

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enough to make it copyable. Apple is certainly not going to make it easy for competitors to churn out Mac clones.

That's another valuable lesson Apple has learned from IBM's experience, as well as its own Apple II saga.

Should Apple ever decide that having Mac clones could be an advantage, it can simply license the Macintosh ROM to a manufacturer and collect royalties on the clones that its licensee produces.

Vern Rayburn, president of Symantec –the company that makes the *Q&A* program for MS-DOS machines–recently observed that most of the exciting software development today is taking place in the world of the Macintosh, not in the PC world.

Suddenly the tables are turned. Many large corporations are now buying Macintoshes for their high-quality output and their ability to integrate text and graphics in an aesthetically pleasing manner.

For such applications, the Macintosh clearly has the edge over the PC. By the time the 386-based machines come along to steal the show, Apple will have built enough bridges to MS-DOS to include MS-DOS emulation on the Mac itself.

In this way, corporations can easily integrate the Macintosh system into a PC environment and exchange data and files, and even programs, through networks.

So Apple has the chance to make the Macintosh a winner in large corporations after all.

Several lessons can be learned from this tale of two systems. One is that you can't always rely on the conventional wisdom of industry gurus for answers to complex questions. They're frequently wrong. Another is that things aren't always what they appear to be.

A year ago, it appeared that the whole personal computer industry had gone into orbit around IBM and would never escape. Now it's not clear who's orbiting whom.

In fact, there may be more than one PC solar system out there. Just watch out for the black holes. And always remember, today's giant nebula may turn out to be tomorrow's dwarf star. □

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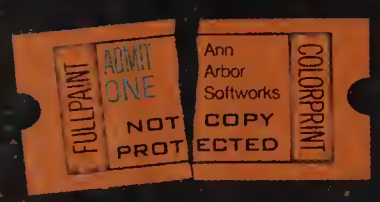

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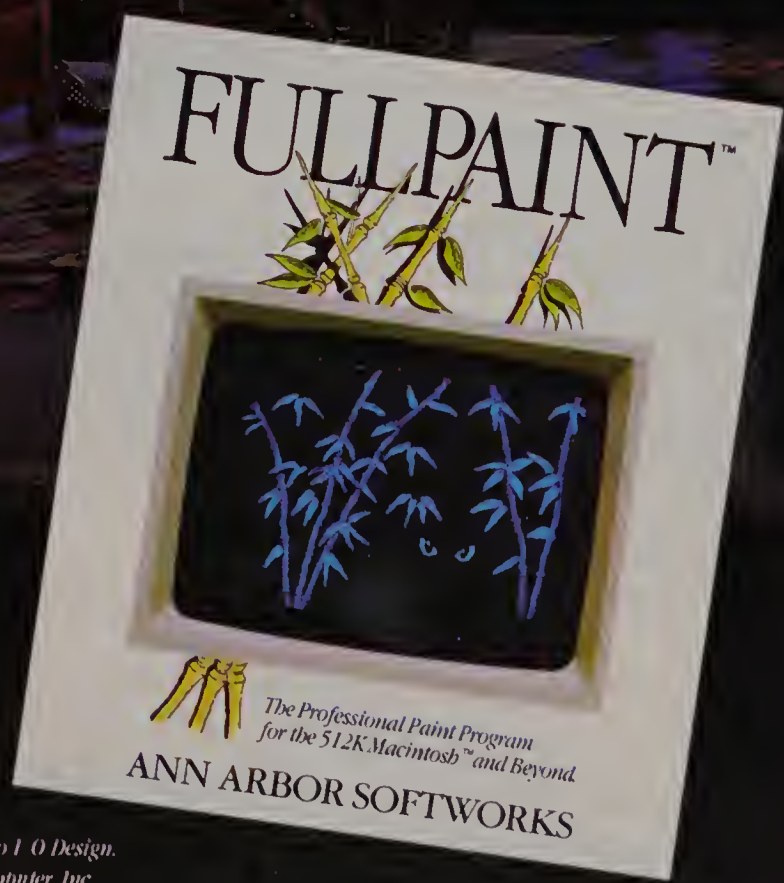

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Running like crazy and getting nowhere?

Try the new quadLYNX Trackball.

We understand. You're attached to your mouse. But it takes up a lot of precious desk space, gets into all kinds of dirt, and those little feet have a tendency to wear out. That can make the mouse erratic and unusable.

Just like your mouse, the new quadLYNX trackball handles all Macintosh™ software, and plugs directly into your mouse port. Its stationary base is ergonomically designed for almost effortless use. And think of all the desk space you'll save!

The quadLYNX uses a non porous phenolic ball that is perfectly round and impervious to dust and dirt.

Overall quality construction means incredibly precise cursor manipulation. We think you'll agree, the mouse is just no match for quadLYNX versatility, reliability and ease-of-use.

Interested? The quadLYNX price of only $129 includes a full year warranty — nine months longer than the warranty offered by Apple.™ For a limited time we're even offering a $20 rebate when you send in your old mouse. This offer expires Friday, November 7, 1986, Midnight. So call us today. Or talk to one of our dealers. Then, get your hands on a quadLYNX, and quit mousing around.

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quadLYNX

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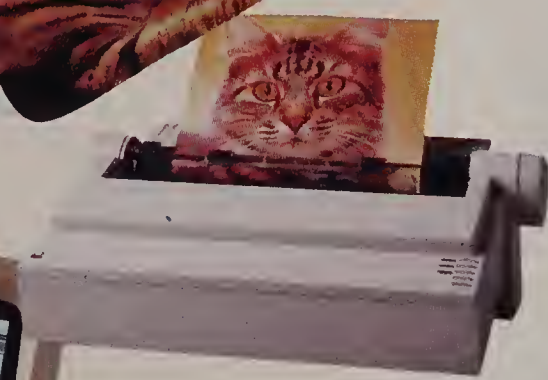
THERE'S MORE THAN ONE WAY TO SCAN A CAT

When you want to create graphics with your Macintosh, there's no need to pussyfoot around with anything less than ThunderScan. Because ThunderScan® turns any printed image into a detailed, high resolution Macintosh graphic. Then lets you change and enhance the image any way you wish. With a powerful set of software tools, written by Mac developer, Andy Hertzfeld.

CAT ***(AKA Kitty)***
Start with any original image, black & white or color, up to 14" wide (with a wide-carriage ImageWriter).



FEED THE KITTY
Feed it into any ImageWriter (I, II, or wide-carriage). ThunderScan simply replaces ImageWriter's ribbon cartridge, so you don't need a video camera.

CAT SCAN
Now ThunderScan is zipping back and forth, digitizing the image at up to 288 dots per inch, in 32 shades of gray.

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With mouse in hand you have micro-control of the contrast, brightness and half-toning. Over all or selected parts of the image. You can scroll, erase, cut, paste, draw...

CAT'S EYE
...enlarge or reduce...

CAT PRINTS
...then print out your finished work on your ImageWriter or LaserWriter. ThunderScan taps the full resolution of LaserWriter, producing exquisite graphics with up to 300 dots per inch.

CATALOG
Cut and paste scanned images into catalogs, newsletters, reports, correspondence, personalized cards and more. ThunderScan works great with page layout software, adding high-quality graphics to your publications.

CAT CALL
You can even send images from Mac to Mac by modem.

So you see, there are as many ways to scan a cat as you can imagine. As long as you have ThunderScan. Just $229 complete. See your Macintosh dealer or contact us.

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Orinda, CA 94563
(415) 254-6581

ThunderScan

ThunderScan, as shipped, is compatible with the 128K or 512K Macintosh, ImageWriter I & II and LaserWriter. Compatibility with the wide-carriage ImageWriter and Mac Plus requires accessories. Contact us directly for answers to your compatibility questions.

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TOPS is the only local area network that connects the Macintosh with PCs. And it's the only one to provide direct real time communications between these operating systems.

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TOPS is 100% AppleTalk™ compatible. For the first time, you can access and work on files stored on remote drives, exactly as if they were in your own computer. Regardless of operating system.

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TOPS eliminates the need for an expensive file server. Any Mac or PC can be a file server or user at the same time. TOPS for the Macintosh consists of one piece of software for each Macintosh on the network, and costs just $149@. TOPS for the PC consists of software and a board for each PC, together priced at a low $389. Networks that don't even come close in performance can cost three times as much.

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TOPS for the PC, $389

TOPS for the Macintosh, $149

Jerry Borrell

What Do Macintosh Users Want?

As the Mac changes, are users following suit?

'Apple may sell as many Macs this year as in the machine's first two years combined.'

Determining how Macintosh users are changing is an all-important pursuit for the editors of *Macworld* if we are to produce a vibrant, entertaining publication. How can one measure the needs and interests of a group of some 600,000 individuals? Moreover, do the needs of a 128K Mac owner coincide with those of the 512K or Mac Plus owner? How do the interests of the longtime Mac user differ from those of the new user? Which products, in a proliferating market, deserve editorial attention?

Finding the answers to these questions is fundamental to serving you effectively. One way we learn is by direct inquiry: quarterly subscriber surveys, phone calls to our readers, and conversations with developers and user group members.

The results provide us with a general reader profile. The most popular applications, we're told, are word processing, spreadsheets, data management, graphics, games, and communications. And while you use the Macintosh primarily for business, it is often found in the home, employed for "personal enrichment."

A significant number of readers acquire new hardware shortly after its announcement. A 1985 survey, for instance, showed that most readers owned 128K Macs, while 1986 results indicated that most owned 512K Macs. This same period also showed significant acquisition of hard disk drives and laser printers.

Your growing numbers reinforce the point: the Macintosh is on the move. Apple may sell as many Macs this year as in the machine's first two years combined. While it's still too early to make generalizations about the expanding Mac user base, we can draw some conclusions. Two trends, in particular, come to mind. First, many new buyers choose the Macintosh for a specific application: desktop publishing; desktop communications; or, increasingly, applications such as engineering and design. Understandably, these users want detailed information on how to use the Mac in their particular fields.

Second, we find a growing intolerance of the problems common to all computers. You want the product to work right the first time around—to be "the right thing." Toward that end, we laud Apple's release of system software version 3.2 and Finder 5.3. When hardware and software developers catch up, we'll see an end to system crashes—provided that everyone converts to the new system versions.

While there's no doubt that the Macintosh and its market are changing, you continue to ask us for certain basics: new product information, how to use hardware and software more effectively, and guidance about which products to buy. Characteristics of the reader also hold steady; the typical Mac user continues to be more educated, inquisitive, creative, and energetic than the general population.

Most of our readers aren't "power users," but they do run a variety of applications on their Macs—and so tend to encounter a broader range of problems than

(continues)

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Because while other accounting software programs only organize

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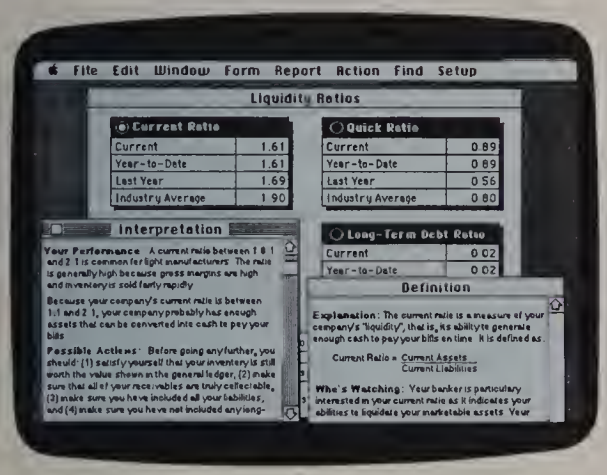

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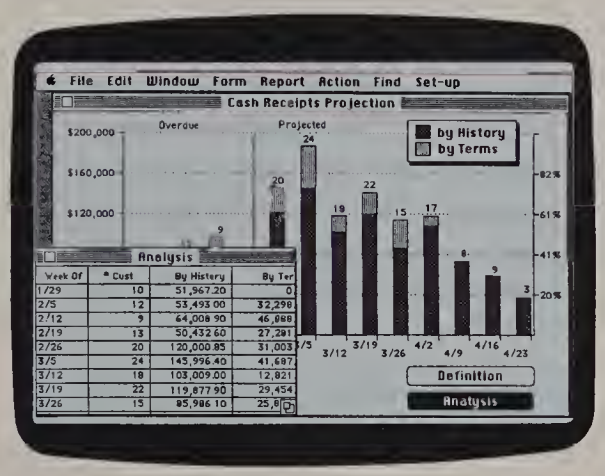

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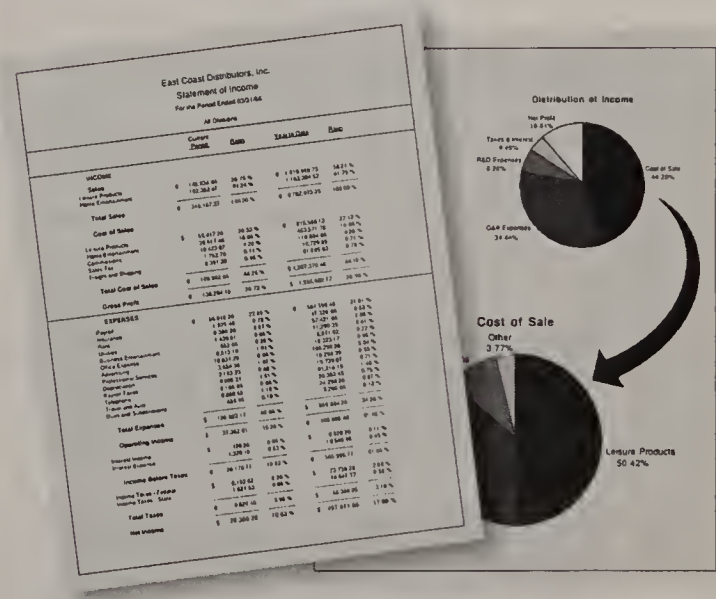

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BRAINSTORM™ installs on any 128K or 512K Macintosh. It provides CONTIGUOUS memory, not banked memory, making it 100% compatible with all Macintosh software. It requires no special startup disk, with either the old or new Apple ROMs. And because BRAINSTORM™ is both ultra-low-power and ultra-low-profile, it is 100% compatible with all Mac hardware, including the Apple 800K disk drive, HyperDrive, and the SCSI Port.

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BRAINSTORM™ contains a custom PowerSaver™ chip which reduces the power to memory by over 50%. So the 1 MEG runs as cool as a 512K, and a 2 MEG with the new CMOS chips runs COOLER THAN THE ORIGINAL 128K. With PowerSaver™, your Mac runs safer--no overheating or power supply overloading--and without a noisy fan.

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Jerry Borrell

One new Mac user: Silicon Graphics' founder Jim Clark, whose company builds high-performance graphics workstations, keeps a Mac at home.

the average IBM PC user, who runs a single application. You also tend to be critical of your tools.

In the interest of speed, you are demanding functionality that even most mainframe and minicomputer users still have trouble obtaining, along with the ease of use that's already synonymous with the Mac.

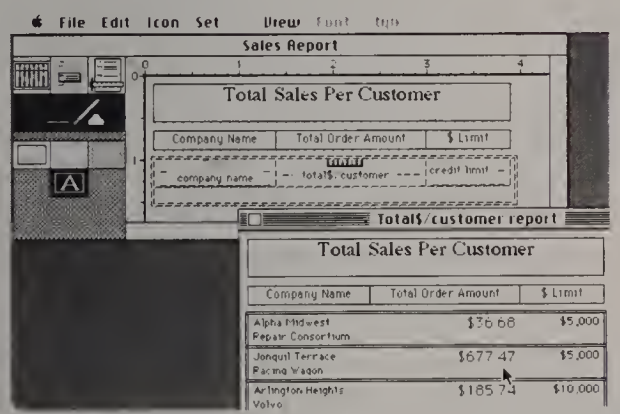
Most of you appreciate what sets the Mac apart from other personal computers because it's the second or third personal computer you've bought. It is used in business, but by people who may also want to play games, program their own applications, or run personal productivity applications.

Although we expect uses of the Mac to change with the open-architecture machines due next February, new buyers are still likely to share many of your interests. No matter how long we have to wait to start exploring the new Mac, we'll probably all be glad we waited for "the right thing." □

NOW YOU AND YOUR BUSINESS CAN DO MORE OF WHAT YOU DO BEST

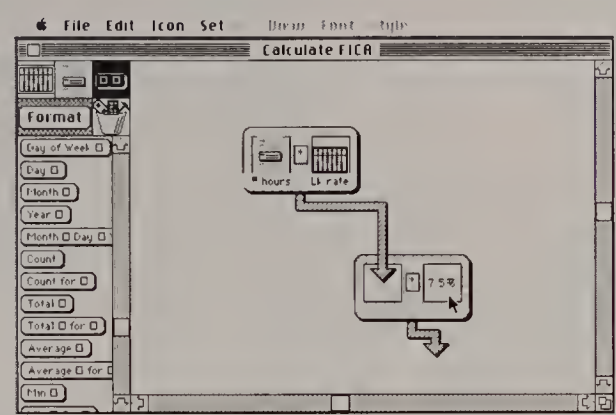
Double Helix
Double Helix is a data-based information management and decision support system — a complete application building environment. With Double Helix you can design a system to run a small business, medium office, or large departmental project.

Works the way you do
Create a complete system according to what you know best — your own business and how it works. Double Helix will not force you to change the way you work. There are no imposed restrictions, artificial structure, or arbitrary procedures. Relational design means that information once entered can be used in any way — now or in the future. You can produce cash-flow statements, customer profiles or research summaries without having to re-enter data. Double Helix is uniquely flexible. It lets you respond to new ideas and evolving conditions as they occur — *without having to rebuild your application.* And no matter how much your business grows, the Helix environment expands to grow with it.



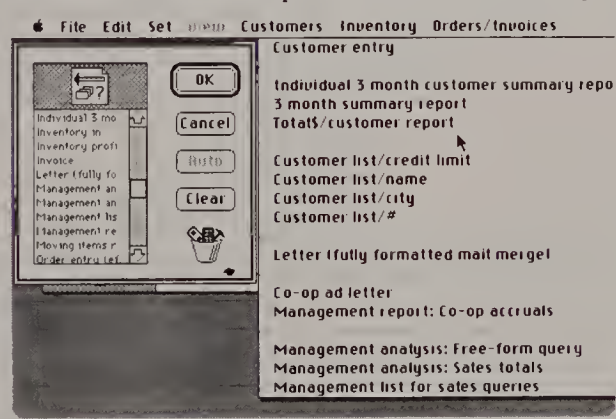
Design forms that reflect the way your business works — from mailing labels to entry forms to presentation-quality reports. All Macintosh fonts, styles and graphics capabilities are supported.

No programming necessary
Use icons and visual design tools to create all the vital input and report forms, lists, analyses, and mail merge letters needed to run your business. No need to learn a programming language, understand arcane command codes or special formulae. Visual building blocks let you quickly set up data-based calculations to take care of any business need; from order entry, inventory control and invoicing to sales analyses, budget tracking and asset management.



With Double Helix, you can fashion visual statements almost as easily as you can say them. Click & drag from among more than 80 calculation tiles in the list to the left. Then just drop in icons or type in constants. Connect with arrows, and you have made a powerful "program" that works automatically wherever it is placed.

Now, applications that anyone can use
Create custom menus with Double Helix. Productive work begins immediately, without computer training or technical support. You can even set passwords to secure your sensitive information and prevent unauthorized changes.



Simply type your own menu names into the Macintosh menu bar, drag form names into the menu and click OK. From then on, just pull down menus to make forms appear for entry, automatic reports, and printing.

Full support from Odesta
This package includes: three disks (the Double Helix program disk, System disk, and Resource/Work disk with sample applications), two reference manuals, a Quick Start Manual and an 18-ring project binder with note pad. To Odesta, your business is as important as our own. Call us toll-free with technical questions or to inquire about our Consulting and Design Services.

Key Features
- Custom menus for full tailoring of applications
- Relational capabilities including subforms to dynamically unite sets of information
- All fonts, styles and graphics supported on-screen and in printing with ImageWriters and LaserWriters
- Double Helix applications work with MultiUser Helix, RunTime Helix and Remote Helix
- Variable length fields, up to 32,500 characters each
- Length of records and files is unlimited
- Number of fields and records is unlimited
- Data stored as text, numbers, pictures, dates, or flags
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- Unlimited key fields and automatically updated indexes
- On-screen Help, Custom Help, and "Why" messages explaining how Double Helix works
- Export/import of data to and from minicomputers, mainframes, or other applications in any ASCII file format
- Interactive on-form and linked-form query functions
- Fast searches and lookups (1.5 second retrieval on 10,000 records)
- Built-in text formatting, including copy, cut, and paste
- Three levels of password protection
- Supports AppleTalk, HD20 and third party hard disks, digitizers and barcoding
- Automatically utilizes up to 4 Mb of memory
- Data entry facilitated by optional use of command and cursor keys
- Graphic elements may be stored as data or used as form decoration
- Supports 17 digit precision SANE™ package (a full implementation of IEEE floating point standard)

Requirements
- Works with the Macintosh Plus, Macintosh 512K Enhanced, Macintosh 512K with external drive. Hard disk or 800K drives recommended.

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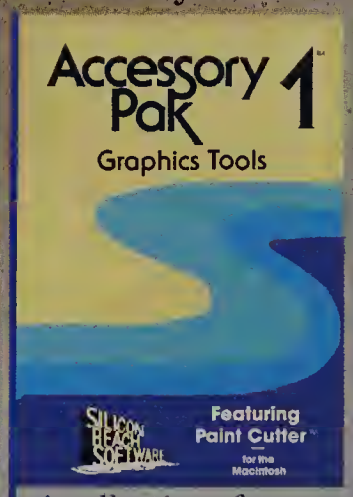

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Steven Levy

Can a Plus Be a Minus?

Taking the upgrade path is costly and confusing but ultimately satisfying

MAX SEABAUGH

Nowhere is it easier to be left behind than in the field of personal computing. Obsolescence is always just a product announcement away. When that happens, users face a tough decision: upgrade, or muddle through with yesterday's technology. Sometimes, progress's relentless advance does not even permit upgrading. Fortunately, in the case of Apple's introduction of the Macintosh Plus, the upgrade is an option.

But is it a step worth taking?

A deceptively difficult inquiry. For my part, I had developed a fierce affection for my Macintosh 512K, nicknamed the Hummer. The machine earned its moniker from the frequent conversational interludes between its internal and external floppy disk drives. Sometimes, when I least expected it (and surely when I least desired it), a message came up on screen that the Hummer required a specific disk, and then it would sullenly wait until I supplied it. The chat then recommenced, conducted in hums of varying pitches.

The Hummer's private discourse symbolized the relative slowness of the original Mac. Owners have come to accept a suggestion to go out and get a cup of coffee after they've given commands to set a program in motion. The Mac Plus, combined with a hard disk drive, promises something else: The Decaf Mac—with no place for coffee in the process.

Specifically, the Mac Plus's improvements include more memory (a megabyte's worth), a double-sided internal disk drive to replace the single-sided one, new ROM chips that somehow speed up digital housekeeping, and a high-speed port—called the SCSI (pronounced *scuzzy*)—for lightning-fast access to hard disk drives that utilize the port. There's also a new keyboard with a numeric keypad and cursor-control keys, the very keys that Macintosh maestro Steve Jobs vowed would never darken the Mac's keyboard. Oh, well.

Owners of 512K Macintoshes can get a whole-hog upgrade for around a thousand bucks, or a baby upgrade (just the disk drive and the new ROM) for three hundred. I went whole hog and bought a brand-new Plus, handing over the Hummer to my friend at home. (And let me tell you, I had some fun getting her Apple II+ files into the Mac—but that's another story.)

Plug-Incompatible

A problem greeted me when I opened the Macintosh Plus box: the connectors for the serial ports don't match the ports on the Hummer. I was unable to hook up my ImageWriter or modem to the Plus without special adapter plugs. After searching frantically in the box for the adapters, I sadly reached the conclusion that there were none in there, and I had to venture into the world and find them.

A frantic survey of New York stores revealed a remarkable shortage of adapter plugs. Finally I found a store that agreed to sell me two adapters for $20 apiece. I ran uptown and purchased two flimsy pieces of plastic and metal with a fair value, I figure, of about $3. It was the most unpleasant experience I'd had since unpacking an IBM PCjr and finding out that the keyboard wouldn't work without batteries (not included).

The next surprise was the end of the hum. The double-sided disk drives on the Mac Plus make a distinctly different sound—a robotic gurgle. The good news is that the gurgle seldom lasts for long—undoubtedly because with the improved ROM chips, the Mac Plus does not access the disk with the same loony insistence as the Hummer did. And, of course, the new disk drive holds twice as much information as the old one.

Drive, He Said

This brings up the question of what people should do with their old disk drives. Not only is it inefficient to use a single-sided drive in conjunction with double-

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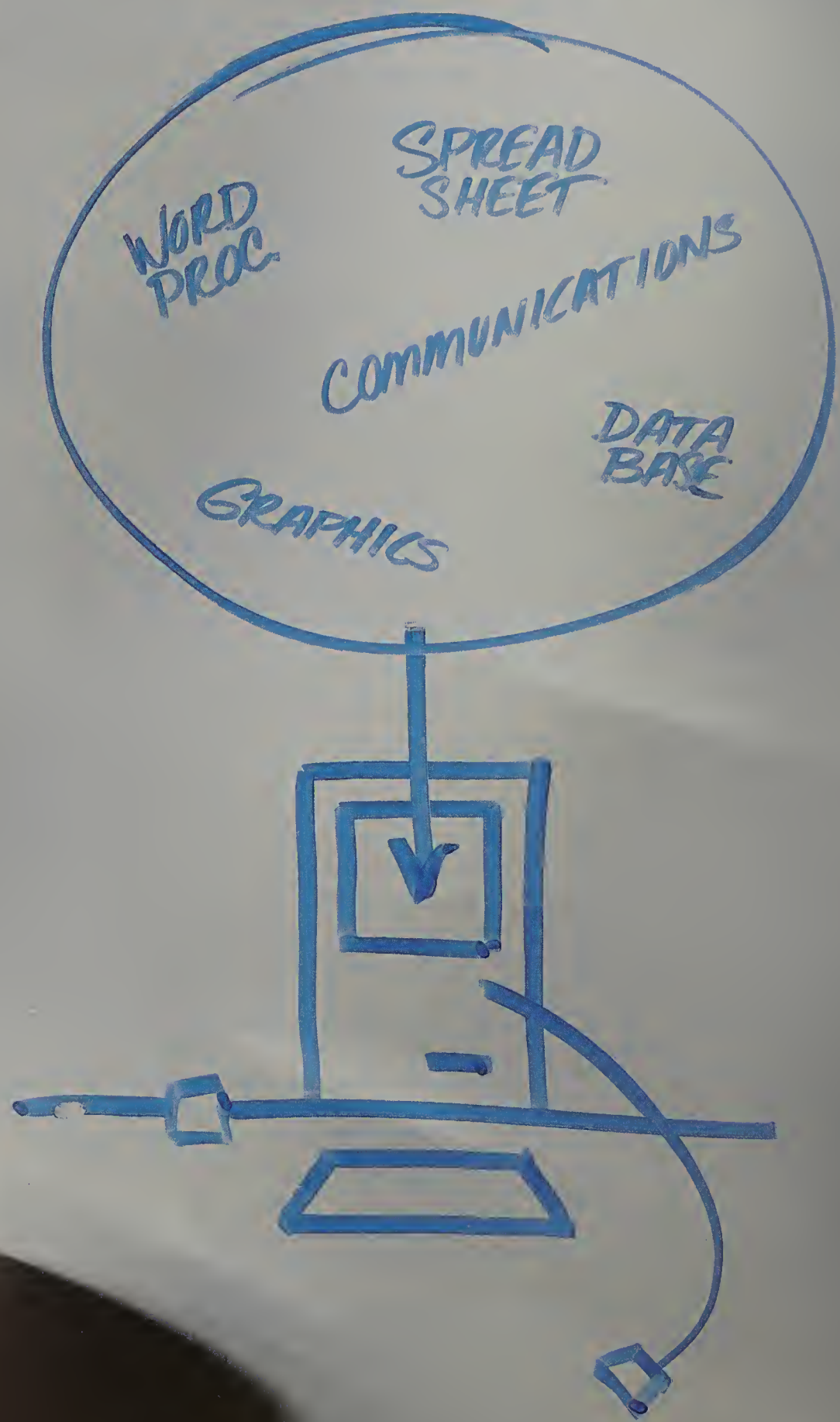

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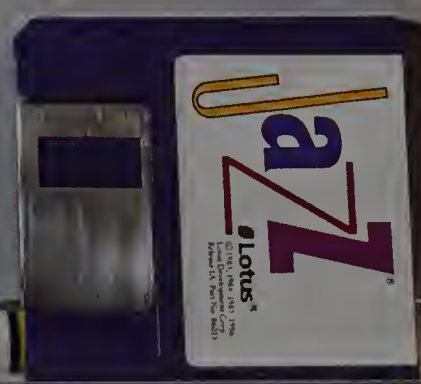

sided disks, it can be somewhat dangerous because of the confusion that inevitably arises in such a situation. Unable to fathom the nature of this (double-sided) beast, the doddering old external drive concludes that it's not a formatted disk at all and asks that you click the mouse to format the disk properly. If you have not been watching carefully, you might do this and wipe out as much as 800K—or an entire book's worth—of information.

For a while, I played with the Plus using no external disk drives at all, hard or floppy, to see if such a stripped-down approach was feasible. I found it not too time-consuming to make up some double-sided disks that included a well-stuffed System Folder, an application or two, and considerable room for documents. For simple word processing or spreadsheeting, this is quite adequate. Then, attempting to take advantage of all that memory inside the Plus, I loaded a System Folder and *Microsoft Word* into a RAM disk (a program that carves out a chunk of computer memory to behave like an extra disk drive, only faster), stuck a floppy into the drive for my document, and absolutely wailed away.

Then, abruptly, I encountered a very weird bug. The cursor on my screen suddenly grew to a height of about 4 inches, and the rest of my text disappeared. And nothing I typed produced a response. Since this is not my preference for turbo computing, I tried to undo whatever I had done, without success. I finally had to shut down the machine, thus wiping out the contents of my RAM disk. After encountering the same problem on my second try, I gave up and went back to using the standard floppy. Then I discovered that somewhere along the line, the computer's clock had gone haywire. It informed me that some of my more recent files were created not in 1986 but in 1904. The idea of time-travel word processing was intriguing, but I would be happier in a less volatile computing environment.

Clouded Vision

What caused the bug? You guess. All I know is that somewhere in the interaction between the RAM disk software, *Word,* the system software, and the new ROM, something was amiss. Is it too much to expect that things go right? Since Apple has done considerable boasting about the easy upgrade path from the Mac 512K to the Plus, you expect the snags to be kept to a minimum.

Instead, adventures. Pull down the calculator and use the numeric keypad to work it; the plus sign on the board makes a minus sign on the screen (I'll ignore the symbolism). The cursor-control keys work in *Word,* but use the numeric keys and no numbers appear, though the cursor moves. Try the cursor keys on *PageMaker* version 1.1, and you'll get little boxes on the screen.

Even worse, some things don't work at all on the Plus. Most notably, certain hardware devices that worked on the Hummer—MIDI interfaces and ThunderScans, for instance—get nowhere on the Plus. Yes, you can buy new MIDI interfaces and new ThunderScans—but what about the ones you already paid for? (At least companies such as Borland offer free upgrades to owners of software that doesn't work on the Plus, and companies such as Microsoft and Lotus package double-sided Mac Plus disks for their products.)

(continues)

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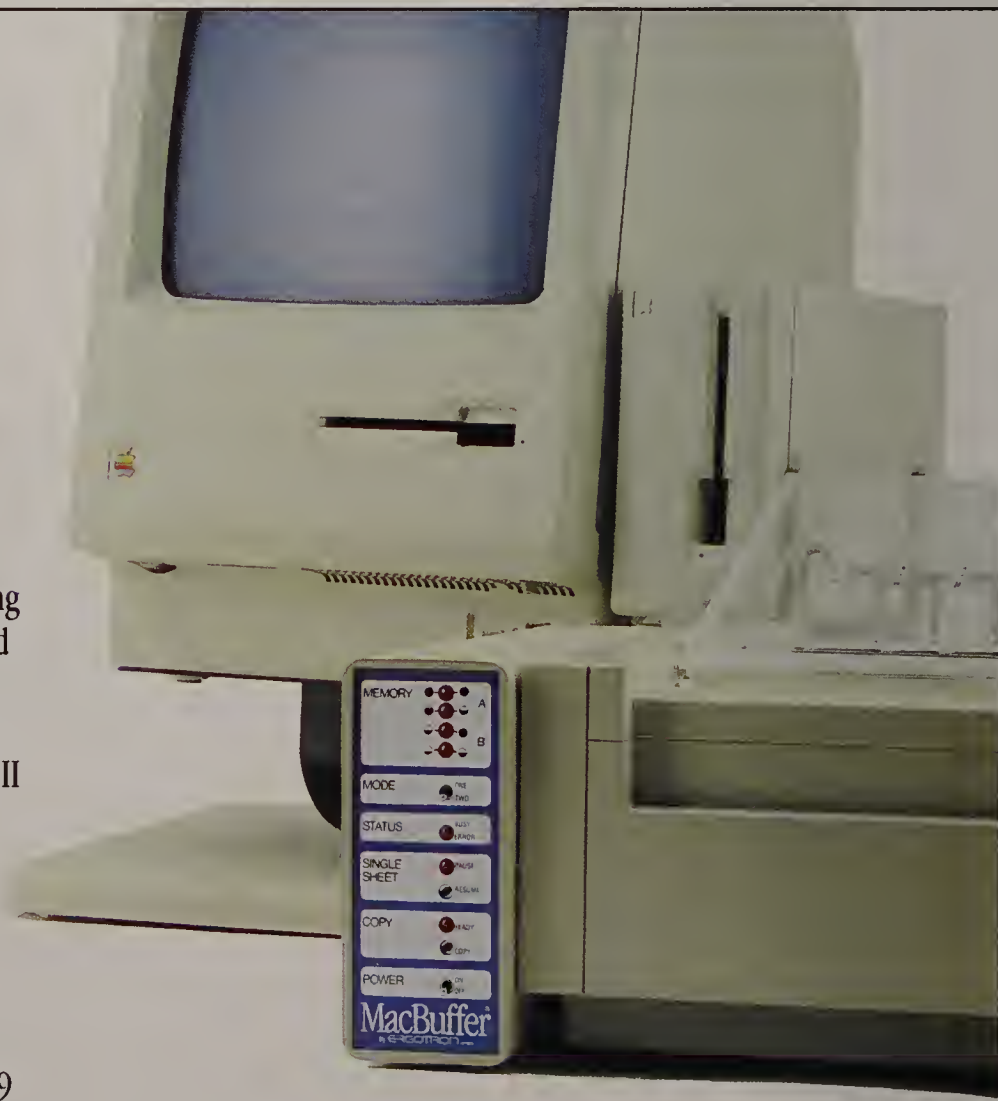

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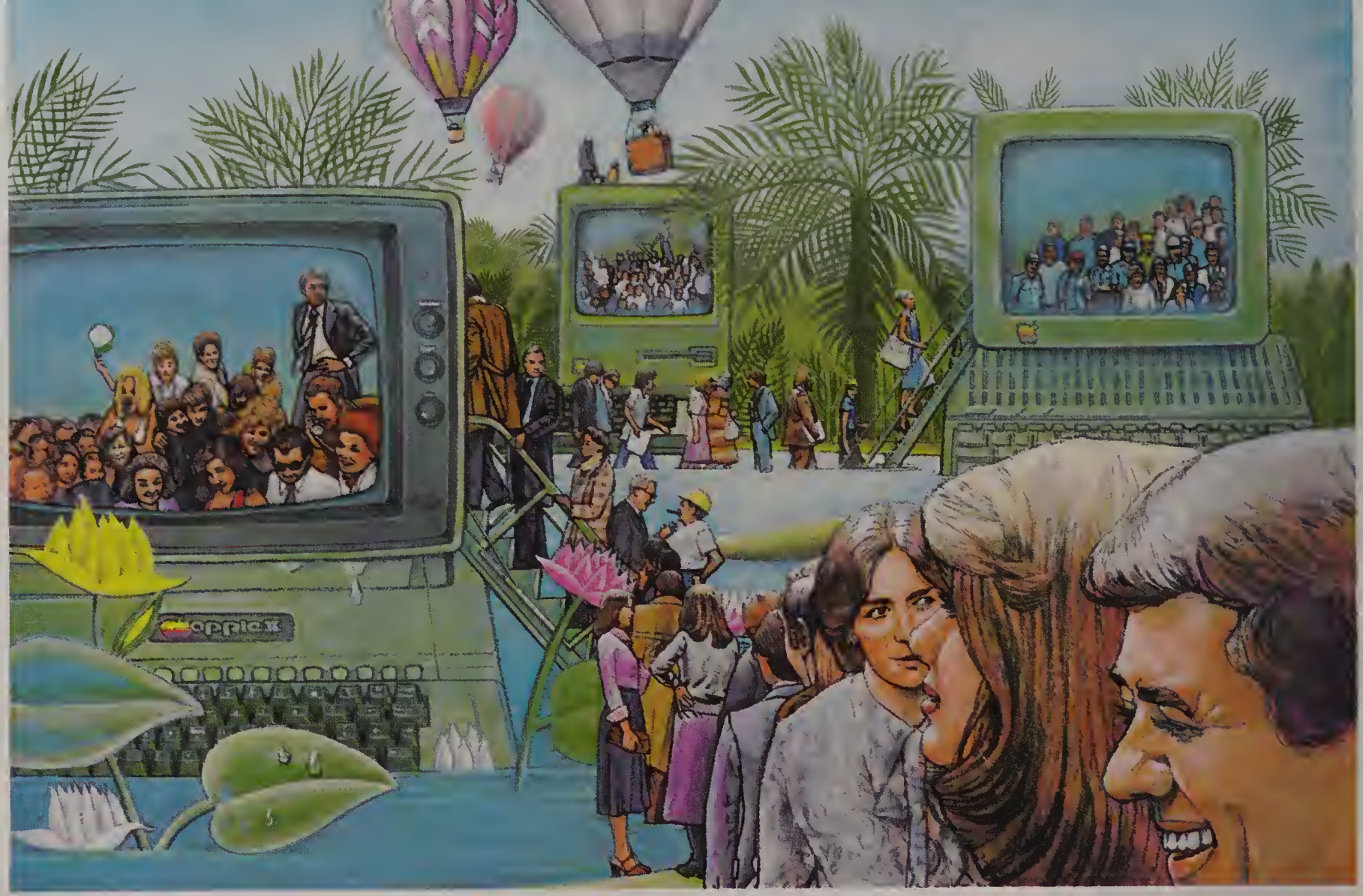

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Then we have the problem of the system software. The first Mac Pluses were shipped with System version 3.1 and Finder version 5.1. The Finder uses the new method of keeping track of files—the Hierarchical File System, or HFS—that doesn't talk too well with files foldered by the previous system. And bugs kept appearing, so Apple issued System 3.1.1 (that's right, three-point-one-*point-one*) and Finder 5.2. Meanwhile the version numbers of the ImageWriter driver and the Desk Accessory Mover kept inching up, too. Finally, I heard of the supposedly final, bug-free System 3.2 and Finder 5.3.

Sound confusing? No joke. Apple is making an effort to keep people informed of the latest updates, but not enough of an effort. Although Apple sends the latest versions to dealers and makes them available on CompuServe for downloading, the burden is still on the users to (1) determine whether they need new versions and (2) take time and expense to get the upgrades themselves. Apple should take the more responsible approach of immediately sending the upgrade disks to anyone who filled out Mac Plus warranty cards, 512K Enhanced Mac cards, or upgrade kit cards.

I run on about these problems because all this improvement has subtly but effectively blemished the vision of the Macintosh: computing without worrying about what a computer is. The way I see it, people should be able to buy a Macintosh as a first computer, go to work on it, and never have to think about what a System is and what a Finder is and what version of these things they have in their machines. That kind of garbage should have gone out with the MS-DOS computers. While I realize this complexity goes hand in hand with the effort to improve the Macintosh, the situation is still disappointing.

Hard Drivin' Man

That said, let me go on to the more cheerful experience of hooking up to a hard disk drive. After a few weeks of using both the Apple HD 20 (connected to the external disk drive port) and a SuperMac DataFrame 20 (connected to the SCSI port), I have to conclude it's the only way to go. In fact, for anyone even considering an upgrade, I recommend going directly to a hard disk drive and not bothering with the sleek double-sided external floppy.

This style of computing is certainly in the heart of the Macintosh vision. Both the hard disks I tried were ludicrously simple to set up: the HD 20 was no more difficult to format than a floppy disk, and the DataFrame arrived already formatted, complete with system software installed. Whereas the early Macintosh hard disk drives were more costly and saddled with complicated software problems, this generation lets you get going with zero learning time and provides an easy discover-shortcuts-as-you-go route to real power computing.

The other big advantage of a hard drive is the ability to build as huge a System file as you want. I built my dream system with fonts of all varieties and desk accessories ranging from stuff uploaded from CompuServe (*Word Count,* a devilishly useful little thing) to utilities like *Tempo,* to several key components from Borland's *Sidekick.* Using *Sidekick*'s phone books, I began to take advantage of my computerized Rolodex for the first time, because I could access the phone numbers—and dial the phone, too—in the middle of any task.

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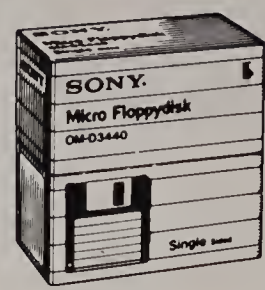

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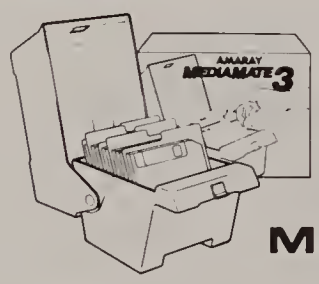

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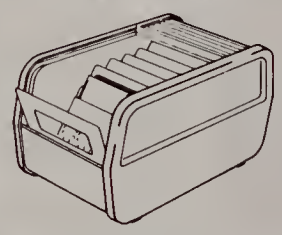

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My only complaint was with the onerous software copy protection that publishers install to punish legal users for the sins of thieves. During the first week of hard-driving, much of what I gained in speed was canceled out by mad searches of my actual desk top to find the required master disk. The very worst happened when the drive on my new Plus ejected a disk only halfway—nothing I tried could free it from the drive. Before I took the Plus to the dealer to liberate the disk, I tried to finish an article in *Word*—but since I could not feed the master disk into the internal drive to certify that I was kosher, I had no access to my legally obtained program.

The solution was a copying program, *Hard Disk Util.* This remarkable program, in uncomplicated fashion, turned me into a master breaker of copy protection—

Is the upgrade worth it? If you measure your life by spoonfuls, it is.

something I have no desire to be, except in self-defense—and allowed me to install unprotected copies of *Word, Excel, OverVue, PageMaker,* and *ThinkTank.* I then settled in to everyday Mac Plus computing—where files open and close with decaffeinated ease—every so often pondering whether the SCSI-driven DataFrame was really much faster than the non-SCSI Apple drive.

I finally concluded that SCSI is faster, but the distinction is trifling compared to Plus computing's big advantages of speed and convenience. Is the upgrade worth it? Well, if you measure your life by spoonfuls, it certainly is, because eventually you'll save enough spoonfuls of time to fill a truck. Just the other day I took some work home and sat down at my old Hummer. Within 5 minutes I was pulling my hair out while the conversation buzzed on.

Sorry Hummer, I've got a new best friend.

Macworld *Contributing Editor Steven Levy wrote* Hackers: Heroes of the Computer Revolution *and is a contributing editor of Rolling Stone.* □

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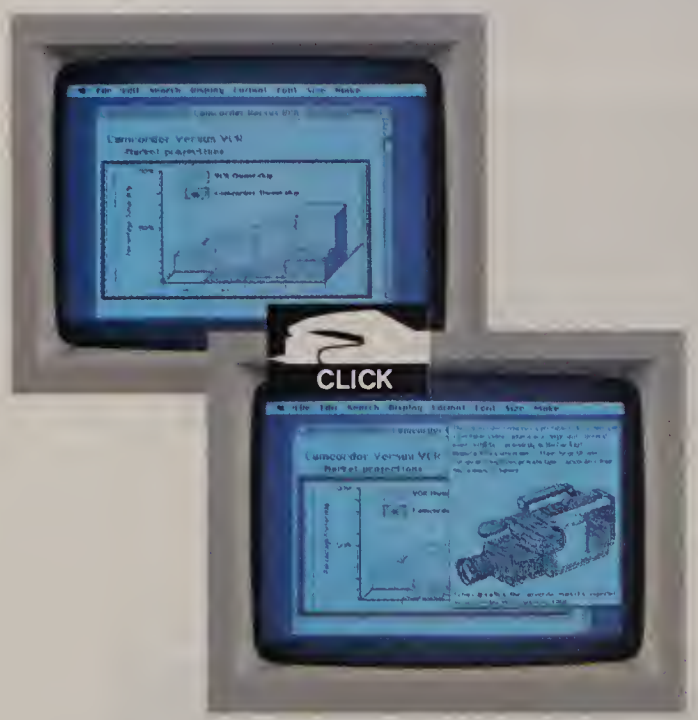

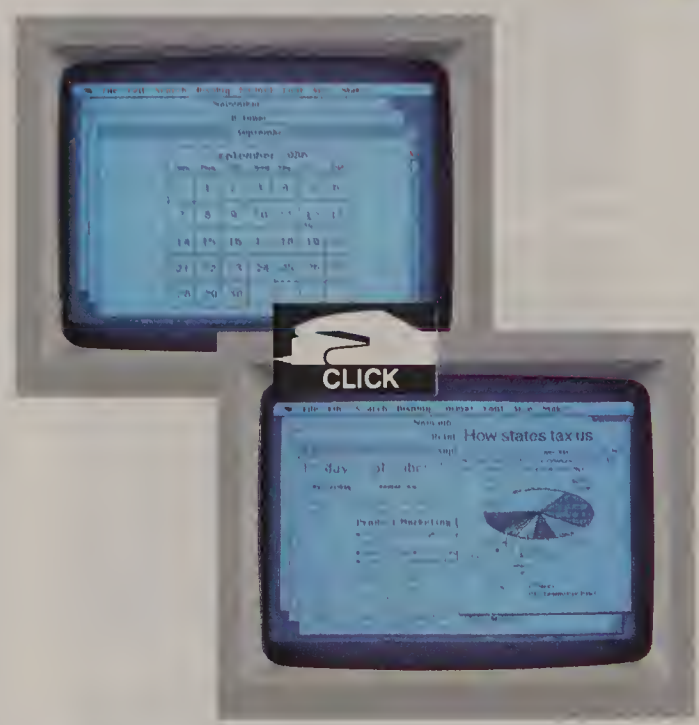

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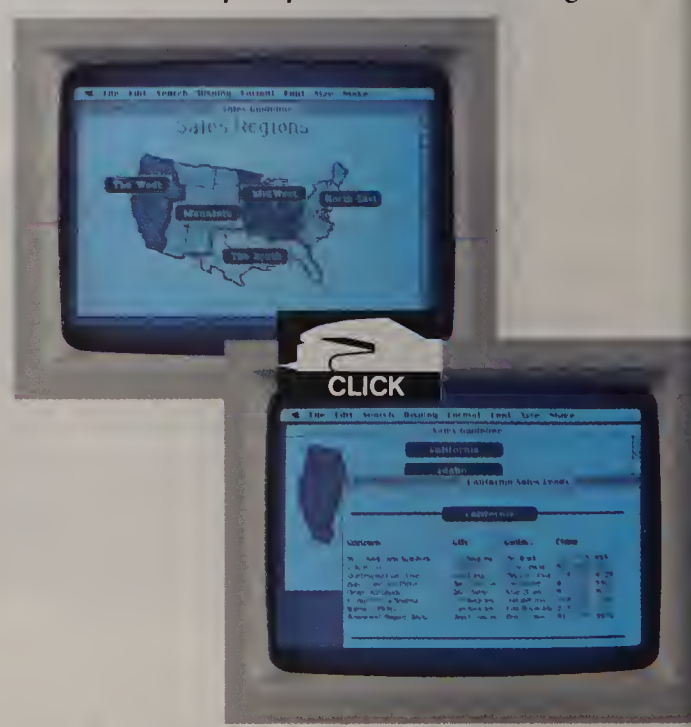

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Letters

The other side of the copyright debate, reports from HyperDrive users, and more thoughts from readers

Mail-Order Blues
I'd like to point out the trouble I've had resolving a billing problem with Northeastern Software. I ordered a program for my church by telephone and charged it on my credit card. Inadvertently, the treasurer also paid Northeastern by check. Despite my repeated efforts to straighten this out, I was still being charged for the software eight months later.

Robert L. Graham
Gales Ferry, Connecticut

We have received a number of similar well-documented complaints, which have been forwarded to Northeastern. The company informed us that in June it had cleared up a backlog of complaints, and sent us word of how each was resolved. We want to hear from others who have tried unsuccessfully to clear up such snags, and we'll try to assist you.—Ed.

Keyboard Nostalgia
I'm not impressed with the Mac Plus's keyboard. On my small desk the old keyboard still makes more sense. I have a numeric keypad but seldom use it. When I do, I place it to the left of my keyboard. Does Apple realize its new keyboard is anti-lefty?

Also, is there any way to get a Dvorak keyboard? I am a poor typist determined to improve, and the thought of learning on a new keyboard is intriguing.

Kevin A. Bickerstaff
West Seneca, New York

The original keyboard works on a Mac Plus, and both keyboards can be converted to Dvorak, as reported in "Keys to the Future" in this issue.—Ed.

Hypertense about Backing Up
Jim Heid's review of hard disks ["Hard Decisions," *Macworld,* June 1986] paints a rosy picture of the HyperDrive. Everything he says is true. It's what he leaves out that's misleading. Heid mentions the nifty backup software, but he misses the glitches and peculiarities of the HyperDrive backup.

Specifically, during incremental backup the HyperDrive does not top off a floppy disk, even if only a fraction of that disk was previously occupied. A dialog box advises that the floppy disk contains data and asks if it's OK to use the floppy disk anyway. Pity the poor user who clicks OK; the cursor freezes on the screen, preventing further operation of the computer.

Do you know how long it takes to erase 25 to 35 floppy disks so you can back up onto them?

Other than that, the HyperDrive is all Mr. Heid says it is.

Dean R. Malissa
Philadelphia, Pennsylvania

For speedy and space-saving backup, the HyperDrive stores data on floppy disks with a unique file system that does not recognize data already stored on the floppy disk. But a General Computer Company spokesperson says the backup program ought to automatically erase the floppy disks when the user clicks OK in the dialog box; the company is sending a new copy of the software to Mr. Malissa.—Ed.

Take a Stand
A quick look at the comparison table "Hard Disks at a Glance" in the June issue's "Hard Decisions" leads one to think that the HyperDrive is the only way to go. But the article says nothing decisive in this regard.

Why didn't Jim Heid cover the technical support aspects of each drive? When I call General Computer, the technical support staff is very friendly and generous with its time.

I'll stand on my soapbox and tell anyone that the complete software package, hardware reliability, sheer speed, and ease of use make the HyperDrive the clear leader of all the hard drives.

Lonnie M. Luce
San Angelo, Texas

The fact is, different users have different needs. While our reviewer prefers to work on a HyperDrive or a MicahDrive,

(continues)

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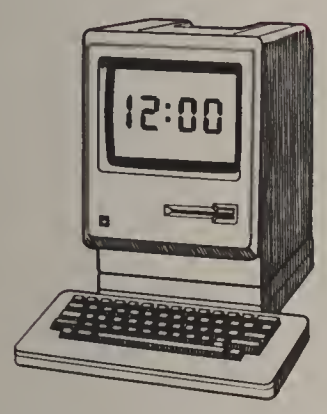

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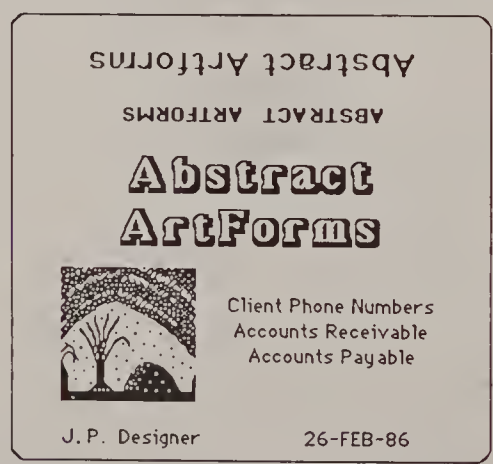

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some people need greater storage capacity, and others want an external hard disk. The review stated preferences within those areas. In addition, not all factors can be quantified in a comparison table.

We would like to report on user support, but we often evaluate products so early in their life that there aren't yet any users to query about their experience. —Ed.

Copyright and Wrong

In response to Paul Heckel's June *Note Pad* cheering Apple's attempt to copyright the look and feel of the Mac's user interface: thank goodness it was VisiCorp and not Apple that first developed the computer spreadsheet; otherwise there would be no Lotus *1-2-3*, no *Excel*, no *Jazz*—not much of anything except *VisiCalc*.

Would Apple have won the Digital Research case in court? When Apple sued Digital Research, it picked on a vulnerable company with a fraction of Apple's financial resources. While the AT&T UNIX personal computer uses a mouse, windows, and pop-up menus, it doesn't appear that Apple has raised the slightest objection.

What is in the best interest of society? Sir Isaac Newton may have discovered gravity, but he didn't invent it. The principles of the ideal human-machine interface remain to be *discovered*—not invented. And certainly not copyrighted.

Leon Cejas
New York, New York

Aldus Saves the Day

After I upgraded my 512K Mac with the new ROM and an 800K drive, I was dismayed to find that I was losing pages of my *PageMaker* layouts. The technical support staff at Aldus Corporation explained that the trouble resided with bugs in Apple's 3.0 version of the system software, which came with the upgrade.

The next day a courier arrived with a beta-test version of Apple's 3.2 system, courtesy of Aldus. Talk about service! That afternoon I had my newsletter completely laid out, with no apparent bugs.

Brian Hines
Salem, Oregon

FORTRAN Revisited

I bought Macintosh FORTRAN version 2.1 ["FORTRAN's New Life on the Mac," June 1986] for my Macintosh Plus, mouth agape at the power I thought I had just acquired.

(continues)

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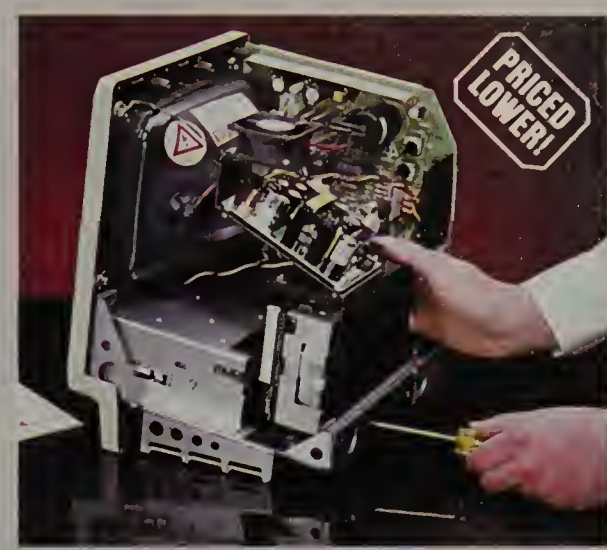

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HFS Compatible	**Yes**	Yes	Yes	Yes	**Yes**	Yes	Yes
Mac Plus Compatible	**Yes**	Soon	Yes	Yes	**Yes**	Yes	Yes
Data Transfer Rate, Mb	**5.0**	5.0	5.0	0.5	**5.0**	5.0	5.0
Avg. Drive Seek Time, ms	**65**	85	63	85	**65**	66-85	70
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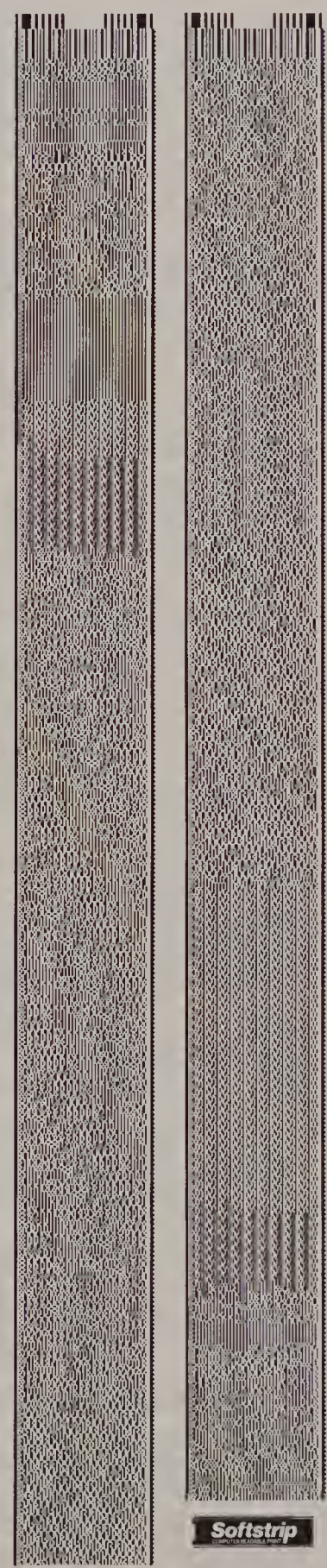

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The symbolic debugger alone brought a buzz to my head; hassle-free FORTRAN at last, in true Macintosh tradition. But my joy quickly degenerated as I found irritating bugs and idiosyncracies that your review did not mention.

Michael Treacy
Pittstown, New Jersey

Version 2.1 did not work with the Hierarchical File System of the Macintosh Plus. Absoft produced version 2.2, now available from Microsoft. Our reviewers did not encounter any bugs, though the developers had included a list of about a dozen known bugs in the package. Most developmental languages are evolving tools that have some bugs; the ones Absoft listed were so minor or esoteric that they do not diminish the power, ease of use, or functionality of Mac FORTRAN.—Ed.

A Is for Author, B Is for Book Length

Your review of *MacIndexer* [*Macware Reviews*, June 1986] was interesting, but I suspect that the product wouldn't be much help in creating a subject index for a serious book, although it might be all right for an author or title index. Such a program works by noting occurrences of words in text, though ideas are the foundation of a good index. In my book, for example, I use the terms *atomic war* and *nuclear war* interchangeably, yet I would want the index to list together passages containing those phrases. It takes human intelligence to see that varying terms belong under the same heading or require cross-referencing.

In addition, if you are having a book published professionally rather than printing it out on the Mac, *MacIndexer* would be of little use because your manuscript's page numbers would be unlikely to match those of the printed page.

Paul Brians
Pullman, Washington

Plaudits

Steven Levy's "Room for Improvement" and David Bowen's *Note Pad* in the July issue should be required reading for every software and hardware developer. Made good reading for us users, too. Thanks for saying it like it is.

Deacon MacCubbin
Via CompuServe

(continues)

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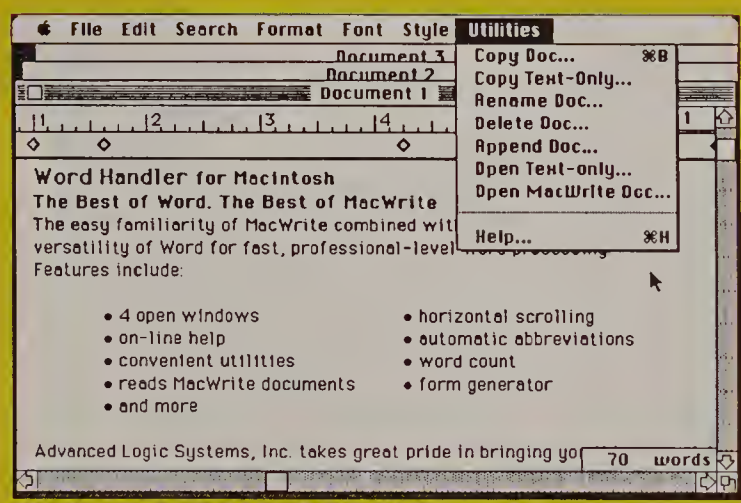

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that is included FREE makes many common business jobs (expenses, fixed assets, mailing lists, purchase orders, etc.) even easier. All you have to do is fill in the blanks.

Requires 512K or Mac Plus

Mirror MagNet 40/40 SCSI Drive

From Mirror Technologies **$2495**

ICON SELECT REVIEW

Designed to fit under your Mac and into your budget, the Mirror MagNet 40/40 SCSI Drive from Mirror Technologies wastes neither desk space nor dollars. This powerful hard drive with tape backup offers speed, large capacity, dependability, multi-user networking software, and peace of mind. Perfect for big applications such as desktop publishing, CAD/CAM, and financial modeling where large storage capacity and dependable backup are crucial. Incorporating a 40-meg NEC Winchester drive and a 40-meg tape drive from 3M, the MagNet 40/40 connects directly to your Mac Plus' SCSI port. MacServe (a $250 value) is included FREE, allowing the entire office to share this drive over AppleTalk. Put the MagNet 40/40 to work in your office today!

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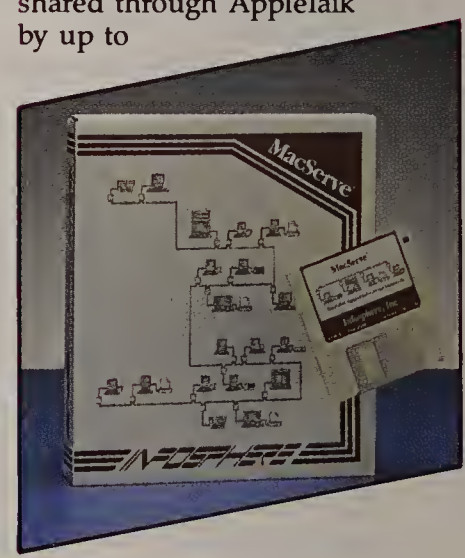
MacServe 2.1

From Infosphere **$250** per server

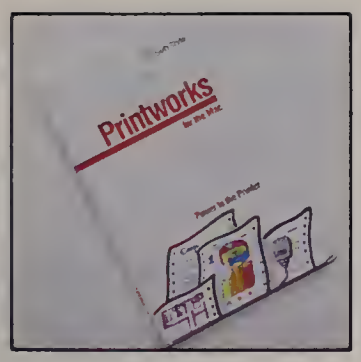
Installed as a desk accessory, MacServe facilitates hard disk management to include better disk performance and data security via password protection. Partition your hard disk into as many as 16 volumes that can be shared through AppleTalk by up to



31 Macs. Additional features include: print spooling; on-line help; backup utility; disk caching; and compatibility with multi-user databases. Since MacServe runs in the background, you retain the full capabilities of server Macs at all times. And MacServe automatically reconnects all users with no loss of data if and when your server goes down.

Requires 512K or Mac Plus; no charge for user nodes

Icon Review



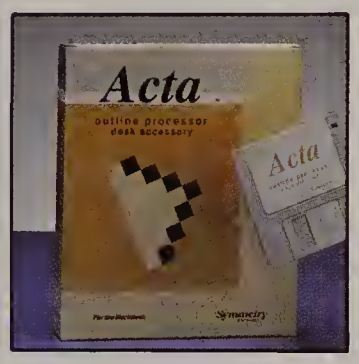
Printworks
From SoftStyle **$49**

Print faster. Print while you work. Print color on the ImageWriter II. Print previews of pages to the screen, then skip or print. Print near letter quality on any ImageWriter. Print merged printer text with graphics. Printworks for the Mac is the first color, high-performance ImageWriter printer driver. It installs quickly on an application disk or hard disk to speed all printing operations. Includes three desk accessories, four printer-spaced fonts, and more than 15 drivers to power most popular printers.

512K or Mac Plus recommended but not essential

Acta
From Symmetry Corp. **$39**

Now every application can have a built-in outline processor! Acta is a powerful, easy-to-use outline/idea processor that installs as a desk accessory so you can use it with any program. Simple Copy and Paste procedures let you copy your outline into any application. You can even save outlines in MS Word- or MacWrite-compatible formats and convert Think-Tank documents to Acta documents. Use Acta to prepare and organize schedules, reports, manuscripts, journals, seminars, documentation—any written material.



Mahogany Disk Holder
From Smith & Bellows **$28**

The good looks and functional design of this handsome wood disk holder will add a touch

of class to your desktop—while providing years of worry-free protection for your disks. Beautifully crafted of highly polished mahogany, each box holds up to 96 disks in six compartments for easy reference. Lock-stop hinges that allow the lid to remain open, a heavy-duty latch with internal lock, and felt pads on the underside to protect your work surface are the details that make this disk holder as practical as it is elegant.

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From Odesta

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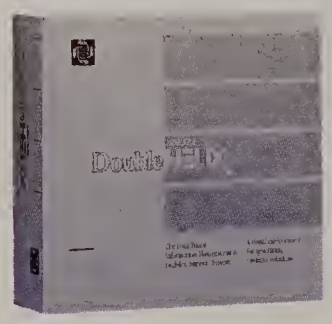
More powerful and even easier to use, Double Helix takes a quantum leap ahead. New features include: the ability to create customized pull-down menus; three levels of password protection to secure structure and information; subforms for easy invoices and powerful reports; expanded data import/export capabilities; global delete; and speed and statistical optimization. Double Helix allows 32,500 characters per field and 255 sort fields.

While Helix 2.0 is an incredible bargain at this special low price, Double Helix delivers equal value for those who need its expanded capabilities. Both packages are powerful, flexible, and backed by excellent technical support.

Both programs are Mac Plus compatible

Helix 2.0 **$ 99** **Double Helix** **$299**



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Requires 512K or Mac Plus

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Challenger Software
Mac 3D *SPECIAL* $119

Cricket Software
Cricket Graph $129
Plots 20 times more data points than Excel!

Datafood Software
DrawForms $30
Requires MacDraw
MacForms $42
Requires MacPaint

Desktop Graphics
DrawArt $29

Electronic Publisher
MacMatbook *NEW* $69
Indexed clipart accessed as Desk Accessory

Enabling Technologies
Easy3D *SPECIAL* $89

Innovative Data Design
MacDraft 1.2 *NEW* $189
Most powerful drafting tool for the Mac

I/O Design
ColorPrint $25
Print your graphics in color!

Living Videotext
MORE *NEW* $195
Outlining with presentation graphics

Manhattan Graphics
ReadySetGo 2.1 *SPECIAL* $99
Best value in page processing—fast, flexible, and powerful!

Silicon Beach Software
Accessory Pak #1 $21
Silicon Press *SPECIAL* $42
Makes color labels on your ImageWriter II

SoftStyle
Colormate $59
Print MacPaint, other documents in color
Colormate Art $29
Colorful clipart library

Springboard Software, Inc.
Art a la Mac *NEW* $29
More than 600 clipart pictures

Symmetry
PictureBase $55
Organize your picture files for easy access!

T/Maker
ClickArt Effects $29
Add tools to MacPaint
ClickArt Holidays $29
Images with a holiday or party theme
ClickArt Letters $29
ClickArt Personal Graphics $29
ClickArt Publications *NEW* $29

MUSIC

Kette Group
MacNifty Sound Digitizer $99
MacNifty Studio Session $69

HOME

Rubicon
Dinner at Eight $35
Now Mac plans gourmet meals
Silver Palate Collection $29
Requires Dinner at Eight

X-10
Powerhouse
Computerize home or office for convenience & security
- Computer Interface $69
- Manual Controller $9
- Burglar Alarm Interface $26
- Thermostat Control Set $25
- Appliance, Lamp & Wall Modules $15 each

EDUCATION

First Byte
First Shapes *NEW* $30
Kid Talk $39
MathTalker *NEW* $39
SmoothTalker $49
Speller Bee $39

Great Wave
KidsTime $33

QED Information Services
Typing Made Easy $35
It works!

GAMES

Too many games to list all! Please call for prices of your favorites.

Broderbund
Ancient Art of War $29
Knights, Archers, Cowboys, Indians, and more!

Microsoft
Flight Simulator $33

Mindscape Software
Comic Works $49

Practical Computer Applications
MacGolf $39
Requires 512K or MacPlus

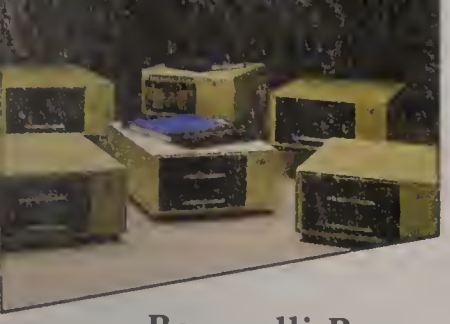
Psion
Psion Chess $33

Spectrum Holobyte
Orbiter $27
Space shuttle simulator

DESK ACCESSORIES

Cortland
Top Desk $39
Seven for the price of one!

Dubl-Click Software
Calculator Construction Set $32
New low price!



Bernoulli Boxes
From Iomega

The Bernoulli Boxes for Mac Plus offer fast, reliable, and cost-effective mass-storage solutions for any office. Features include auto-boot, HFS support, and daisy-chaining with other SCSI devices. Average access time is 35 milliseconds, with a data transfer rate of 1.13 megs/sec. The unlimited data storage, efficient backup, and maximum flexibility provided by 10- or 20-meg removable data cartridges put the Bernoulli Boxes in a class by themselves.

All require Mac Plus

Single-Cartridge Drives
- 10 Meg $1495
- 20 Meg $1895

Dual-Cartridge Drives
- 10 + 10 $2095
- 20 + 20 $2695

10-Meg Cartridges (3pk) $ 169

20-Meg Cartridges (3pk) $ 219

Cleaning Kit $ 75

Imagine Software
Smart Alarms $39
Integrates appointment book with alarms —flashes timely reminders for appointments

Target Software
MacLightning 2.0 *SPECIAL* $54
THE breakthrough design in spelling checkers; requires two drives
- Legal Dictionary $69
- Medical Dictionary $69
- Merriam Webster Thesaurus $33

Dictionary supplements require MacLightning

T-Maker Graphics
ClickOn Worksheet *SPECIAL* $45
Great for casual spreadsheet use

UTILITIES

Affinity Microsystems
Tempo $79
Powerful macros with logic branching

Central Point Software
Copy II Mac $20
Includes hard disk install

FWB Software
Hard Disk Backup $39
Hard Disk Utility $59
Removes software copy protection to install on hard disk

Greene, Johnson Inc.
Spellswell $45
Catches capitalization & homonym errors

Ideaform
MacLabeler $29
Enhanced version!

Innovision
Calliope *NEW* $49
Helps capture & refine creative ideas

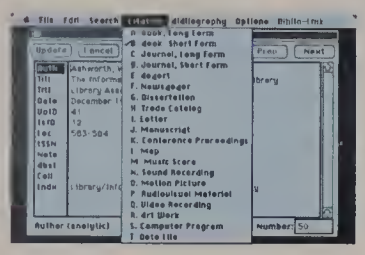
Kent Marsh Ltd.
MacSafe *SPECIAL* $52

MacMemory, Inc.
MaxRAM/MaxPrint Disk *NEW* $33
Save time w/RAM disk & print spooler

Macromind
Macromind Utility Disk *NEW* $29

Professional Bibliographic System 2.56
From Personal Bibliographic Software **$220**

The easy way to create, maintain, and retrieve properly formatted bibliographies and reading lists! Select one of 20 standard bibliographic document types for input; choose from four popular style sheets—APA, MLA, Science, ANSI—or customize your own. This new version speeds operations and allows alternate fonts. The



optional Biblio-Links programs listed below reformat records downloaded from specific on-line services and transfer them into Professional Bibliographic System.

BRS
Dialog
MEDLARS **$149** each

Micro Analyst
MacZap $39
Hacker's backup utility and more!

Nevins Microsystems
TurboCharger 2.0 $39
New, more powerful Disk Cache works with hard disks

New Canaan MicroCode
MacDiskCatalog II *SPECIAL* $33
Organizes your disk library

PBi Software
HFS Locater $29

COMMUNICATIONS

CompuServe
Starter Kit $29
FREE with Hayes Bundle

DataViz
MacLink w/8' Cable *SPECIAL* $109
Transfers and converts files between Mac and IBM

Hayes
SmartCom II $99
Smartmodem 1200 $429
Smartmodem 2400 $649
Smartmodem-to-Mac Cable $18
Please specify either 1200 or 2400

1200 Smartmodem, SmartCom & Cable (Bundled) $CALL
We add FREE CompuServe Starter Kit!

Mac 'N Frost
From RH Electronics **$79**

Mac 'N Frost is a high-powered, quiet fan that reduces heat build-up to protect your Mac's inter-

nal components. This sophisticated cooling system also features a dual-switch accessory control and two-stage surge suppression. The Mac 'N Frost unit fits into the top of your Mac, leaving the handle free for easy transport. For added protection there is a "touch-me" static discharge plate; for added convenience there is a small storage compartment that holds up to five diskettes.

Transet 1000/128K $299
Multi-function buffer and switch—incredible!
Transet 1000/512K $419
Transet Mac Accessory Kit $29

Infosphere
MacServe *(per server)* $250
Partitions hard disk, network disk server, print spooler & more!

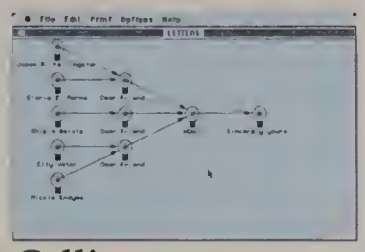
Micah, Inc.
Micah Tops *NEW* $129

Software Ventures
MicroPhone *NEW* $69
Best communications software!

Think Technologies
In Box Starter Kit *NEW* $219
Includes 3 connections; send electronic mail over AppleTalk
In Box Personal Connection $65

Top Express Ltd.
TopMail $175

USRobotics, Inc.
Courier 2400 Modem $499
Combines power, ease of use, and many special features
Password 1200 Modem *NEW* $239



Calliope
From Innovision **$49**

Calliope (named for the muse of writing) is a tool for the capture and refinement of ideas. The fact that it does not impose any structure on your ideas unless you want it to is one of the things that distinguishes Calliope from outline processors. Develop individual thoughts in depth or link related ideas into clusters; use Calliope to log phone calls, create letters, and work on large projects—all in the same workspace.

Requires 512K or Mac Plus

HARDWARE

Cuesta
90 Watt Datasaver $299
200 Watt Datasaver $399
Protection from power blackouts

DC Systems
EasyDrive 20 meg SCSI *NEW* $779
EasyDrive 30 meg SCSI *NEW* $879

Ergotron
MacBuffer 256K $249
MacBuffer 512K $375
MacBuffer 1024K $575
Hot new print buffer

Kensington
Surge Suppressor $34

Koala Technology
MacVision *SPECIAL* $169
Puts images from your video camera into Mac

MacMemory, Inc.
The MaxPlus $399
Upgrade your Mac Plus memory to 2 meg. Plugs into standard SIM sockets; includes Max Chill fan and software

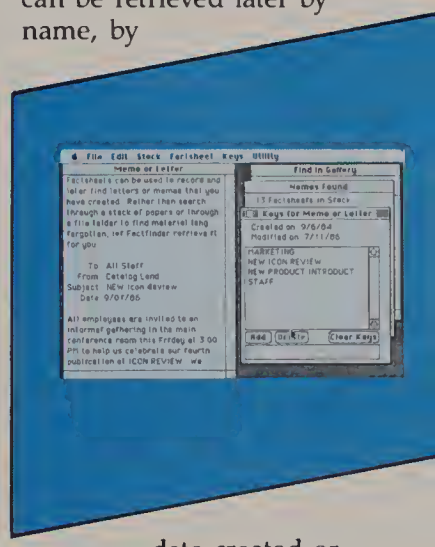
Summagraphics
MacTablet 6"x9" $299
MacTablet 12"x12" $399
Absolute pointing device, great for tracing and drawing

Systems Control
Mac Gard $59
Protect your Mac from power surges

ICON SELECT REVIEW

Factfinder
From MindWork Software **$49**

Factfinder is a text-retrieval system. Use it to store, organize, and cross-reference all your phone numbers, addresses, recipes, and miscellaneous notes. Information is entered free-form—no fields to define or formats to choose. The electronic index cards, or Factsheets, you create with Factfinder can be retrieved later by name, by



date created or last changed, or by keyword search. If you need help, open the index window—names, dates, and keywords are neatly organized for rapid retrieval. Perform complex boolean searches, cut and paste between Factsheets or other applications, or save selected Factsheets to disk as text files that can be accessed by your word processor. A must for every memo writer, manager, researcher, writer, student, teacher, or professional.

Mac Plus compatible; not copy protected

Thunderware
ThunderScan *SPECIAL* $185
ThunderScan Adapter Kit $89
For MacPlus
ThunderScan Super Bundle $249
For Mac Plus owners; includes adapter

ICON SELECT REVIEW

Orders only **800/228-8910**
In California **800/824-8175**

MacBottom 20 SCSI Drive $949
From PCPC

The new MacBottom 20 SCSI Drive gives you 20 megs of storage and nearly instant access to all your applications and files. It permits fast backup to floppies—copy entire volumes, changes only, or selected files. Daisy-chain as many as seven for increased storage. A resizable print spooler saves you time by buffering print files so that you can work at the keyboard while printing on your ImageWriter. This drive is quiet, reliable, highly portable, and FAST. Available now at an incredibly low price!

Requires Mac Plus

DISK DRIVES

AST
AST-2000 $2195
20 meg Winchester, 20 meg tape backup
AST-4000 $5295
74 meg Winchester, 60 meg tape backup

Ehman Engineering
Ehman 800K External Drive *SPECIAL* $199

Iomega
Bernoulli Boxes for Mac Plus *NEW*
- 10 Meg Drive $1495
- 10 + 10 Dual Drive $2095
- 20 Meg Drive $1895
- 20 + 20 Dual Drive $2695

Cartridge drives add flexibility

Mac Pascal Update

June's *Macworld View* mentioned a new version of Macintosh Pascal. How do I get this update?

Dana Wannemacher
Estes Park, Colorado

Apple distributes updates through its dealers; simply trade in your 1.0 disks. To find the dealer nearest you, call 800/538-9696. Telephone before going in to make sure the dealer is prepared to make the swap. Some dealers may provide upgrades by mail; you make a backup before sending in your master disks and then await the new version. –Ed.

Over the Hill Seekers

How can I reach the "over the hill hackers" featured in the June *Macworld View?*

Mike Clark
Via AppleLink

Contact Manny Nodar and Bert Gader through PD Mac, their public domain user group for the Macintosh: P.O. Box 5626, Sherman Oaks, CA 91423. –Ed.

Corrections

The comparison table in "New Relations," May 1986, erred in saying that ProVue Development Corporation's *OverVue* sends reports only to the printer. In fact, *OverVue* can also send a report to a text file on disk, thus enabling users to paste data into a word processor, print form letters, and export data to other database programs.

Contrary to the report in June's *Macware Reviews, TopDesk*'s print spooler car print graphics in both standard and high-quality resolution. Here's the trick, according to Cortland Computer: because *MacPaint* communicates directly to the serial port and not through the printer driver, you must first paste *MacPaint* graphics into a document in another application, such as *MacWrite*.

Letters should be mailed to Letters, Macworld, *501 Second St. #600, San Francisco, CA 94107, or sent electronically to CompuServe 70370,702 or The Source BCW440. Include a return address. We reserve the right to edit letters. All published letters become the property of* Macworld. □

SuperMac Dealers:

AK: Anchorage: Pictures, Inc. 279-1515; Fairbanks: Empire Electronics. **AL**: Birmingham: AC3 Computing 942-9564; Village Computers 870-8943; Huntsville: AC3 881-6600; Montgomery: AC3 271-2211. **AZ**. Kingman: Computer Room 753-1711; Mesa: Computer Pro 820-5064; Compushare 898-0610; Phoenix: Computer Pro 942-9776; Computer Pro 263-6077; Compushare 943-2938; Compushare 285-0985; Compushare 953-1884; Scottsdale: Computer Pro 949-8833; Tempe: Computer Pro 829-7993. **CA**: Albany: ComputerLand 527-8344; Arroyo Grande: Computer Terminal 481-4860; Bakersfield: Computer Basics 339-5080; Computer Warehouse 327-3393; MicroAge 397-5864; Belmont: ComputerLand 595-4232; Berkeley: CJS Systems 849-3730; Mr. Natural's Computer Stores 548-8155; Spintronics 843-2743; Winner's Circle 845-4814; Burlingame: ComputerLand 348-7731; Carmel: Computer Design 625-6150; Carson: Sun Computers 538-8338; Chico: Computer Center 891-1630; Citrus Heights: Computers for Less 726-1212; Concord: Infomax 689-2331; Costa Mesa: Coast Computer 646-8981; Dublin: ComputerLand 828-8090; Dublin Computers 829-8644; El Cerito: Software Solutions 237-4406; Fresno: OnLine Computers 432-4324; Garden Grove: Inacomp 898-2665; Hayward: Computer Center 538-7368; ComputerLand 538-8080; Irvine: OnLine Computers Plus 551-0220; Wabash Computer 859-5100; La Jolla: University Bookstore 452-4291; LaMiranda: ComputerLand 739-0941; Long Beach: ComputerLand 595-6683; Los Alamitos: ComputerLand 594-6813; Los Angeles: Computer Showcase 474-6409; ComputerLand 837-5388; Los Gatos: Wolf Computer 354-1210; Newport Beach: ComputerLand 476-8360; Oakland: ComputerLand 839-5230; Computer Store 763-7900; Palo Alto: Computer Attic 322-0639 & 328-0171; Computer Ware 323-7557; Pasadena: ComputerLand 449-3205; Petaluma: Executron 778-1242; Pleasanton: Home Business 846-3944; Rancho Cordova: AVC Computers 638-2242; Net Profit Computers 638-0588; Redwood City: Peninsula Office Supply 364-1333 and six other Bay Area locations; Riverside: Computer Kingdom 787-1142; Rocklin: AVC Computers 624-0601; Sacramento: Inacomp Computer Center 427-8993; Net Profit 638-0588; AVC 962-2100; Salinas: Peninsula Office Equipment 424-2103; San Diego: Byte Shop 565-8008; Computer Age 565-4042; Computer Merchants 565-2463; San Francisco: Computer Selection 543-9888; Software for Less 753-1066; Computer Connection 781-0200; Computer Attic 398-4541; ERA Electronics 398-6361; Santa Ana: ComputerLand 929-2026; San Mateo: MicroAge Computer 348-2983; Santa Clara: ComputerLand 246-4500; Santa Cruz: Computer Center of Santa Cruz 458-1644; Computers 458-1644; Stockton: Stockton Computers 952-2028; Sunnyvale: Fry's Electronics 733-1770; Torrence: Personal Computer Center 373-0022; Ventura: Computer Village 644-5226; W. Los Angeles: P.C. Land 478-7709; Whittier: Logic Tree Computers 947-9411. **CO**: Aurora: Connecting Point 366-1566; Boulder: Computerworks 444-6550; Connecting Point 449-8282; Friendly Computers 530-5115; Colorado Springs: Software Land 599-5925; DMA Computer Solutions 475-2488; Denver: CW Electronics 832-1111; Computerland 759-4685; Computerworks 740-8650; Fort Collins: Connecting Point 223-4000; Greeley: Connecting Point 356-7224; Lakewood: Neighborhood Computer 988-9140; Littleton: Connecting Point 973-5849; Longmont: Micro Computer World 651-1177; Westminster: Colorado Computer Systems 426-5880. **CT**: Danbury: The Computer Factory 798-1555; Fairfield: Computerworks 335-6316; Microage 335-3694; Greenwich: Nynex/Datago 629-9100; Hamden: Computer Factory 281-4119; New Haven: Nynex/Datago 782-6200; New London: Computer Lab 447-1079; Norwalk: Microage Computer 347-8428; Simsbury: Logical Computer 651-0241; Stamford: Computer Factory 356-1920; Stratford: Programs Plus 378-3662, Wallingford: Computerease 269-4440; Westport: Computer Factory 255-2822; Wethersfield: Computer Resources. **DC**: Washington: The Computer Factory 879-4955. **FL**: Clearwater: Ray's Computer 535-1414; Clearwater Computer Works 536-2737; Fort Lauderdale: Inacomp Computer Center 492-8055; Unique Solutions 428-8055; Fort Meyers: Microworks 936-4676; Gainesville: Computer System Resouces 376-4276; Jacksonville: Komputer Kingdom 641-9042; Lakeland: Computers Etc. 686-4310; Miami: Integrated Computer 887-4777; Kendal 274-6312; Pompano Beach: Micro Line 928-0444; Sarasota: Computer Centre 955-4451; Inacomp 922-1897; Sattelite Beach: Beach Computer 777-1629; Tampa: Micro Computer Systems 875-0406. **GA**: Athens: Varsity Computing, Inc. 548-3434; Atlanta: Connecting Point 952-0337; Harbinger Microware, Inc. 395-0343; Inacomp Computer Center 998-9120; Inacomp Computer Center 252-9611; Inacomp Computer Center 434-2111; Augusta: Cash Register Exchange 724-1747; CBM Computer Center 737-8313; Carrollton: Century Computers 834-2672; Chamblee: Inacomp Computer Center 451-5498; Columbus: Columbus Computer Center 324-0667; Duluth: Inacomp Computer Center 476-7358; Fayetteville: AIS Computer Store 461-2147; Gainsville: Preferred Sys. 532-3857; Griffin: AIS Computer Store 228-5301; Macon: Computer Source 474-5166; ComputerLand 474-1410; Marietta: FCL Systems 980-9023; Morrow: Inacomp Computer Center 968-8702; Norcross: Varsity 446-3434; Roswell: Rentz Assoc. 998-6995. **IA**: Dubuque: Computers Plus 556-6150. **IL**: Arlington Heights: Computerland 870-7500; Nabih's 253-1972; Aurora: Farnsworth Computer 851-3888; Chicago: Compumat 861-1255; Erickson Communications 631-5181; Golden Rule 929-2592; Evanston: Nabih's 869-6140; Highland Park: Universal Computers 433-8930; Jacksonville: Computer Oasis 245-1461; Lake Forest: Lake Shore Computers 234-1002; Niles: Midwest Computer Center 965-7670; Villa Park: Farnsworth Computer 833-7100; Waterloo: Computer Helper 800-235-6646; Westmont: Compumat 654-0303. **IN**: Fort Wayne: Grahm Computer 423-3422; Marion: Computer Store 662-9994. **KS**: Emporia: Mr. Computer 342-4893. **KY**: Alexandria: Delta Computers 442-0217; Lexington: Lexington Computer 268-1431. **LA**: Metairie: Computer Shoppe 454-6600; Shreveport: Compco Computer 869-1282. **MA**: Acton: Acton Computer Center 263-3600; Allston: University Computer 236-7464; Boston: Nynex/Datago 350-7707; Sherman Howe 423-6787; Nytex/Datago 358-6525; Nytex/Datago 424-0969; Cambridge: Tech Computer 497-0395; Chicopee: Custom Computers 594-6682; Dorchester: K.B. Company 825-3200; Hyannis: Orchard Computer 775-8541; Lynn: Land of Electronics 581-2700; Moburn: Nynex/Datago 932-3866; Natick: Nynex/Datago 651-7630; Newton: Micros Unlimited 964-0202; Sherman Howe 965-8970; Peabody: Computers, Etc. 535-5252; Plymouth: Orchard Computer 747-4683; Randolph: Nynex/Datago 961-4665; Saugus: Land of Electronics 581-3134; Springfield: Nynex/Datago 736-3696; Taunton: Orchard Computer 823-0429; Wellesley: Nynex/Datago 237-6933. **ME**: Portland: Harper Electronics 772-1156. **MD**: Annapolis: Cintronix 261-8337; Beltsville: HLA 345-1123; Gaithersburg: Falcon Micro Systems 341-0100; MacCorner 330-9116; Laurel: Comm Center 792-0600; Wheaton: Computer Crafters 933-5820. **MI**: Ann Arbor: Learning Center 996-1616; Bay City: Inacomp Computer Center 893-6814; Birmingham: Retail Computer Center 644-4820; Columbia: Computer Spectrum 882-7611; Farmington Hill: Retail Computer Center 626-3240; Flint: Inacomp Computer Center 234-0161; Inacomp Computer Center 733-7291; Garden City: Retail Computer Center 425-2470; Marquette: American TV 228-7100; Midland: Inacomp Computer Center 636-7336; Saginaw: Inacomp Computer Center 790-1360. **MN**: Baxter: Computer One 828-4650; Hutchinson: Hutch Computer Inc. 587-2940; Manchester: United Computer 391-9409. **MS**: Meridian: ComputerLand 482-8523; Starkville: Teletronics 323-4614. **MT**: Billings: ComputerLand 259-0565; Computer Store 245-0092; Bozeman: Computer Lines 586-7693. **NC**: Charlotte: Computer Room 377-9821; Greensboro: Computer Gallery 854-2443; Leicester: Great Smokies Software 683-4128; Raleigh: Caroline Computer 469-5555; Rocky Mount: Computer Displays 937-4781. **ND**: Fargo: ComputerLand 237-3069. **NE**: Fremont: Fremont Office 721-6436. **NH**: Manchester: Computer Mart of NH 624-1776; Nashua: Computer Mart of NH: 883-2386. **NJ**: Cherry Hill: Bambergers 665-3214, Cranbury: Clancy Paul 655-8100; East Brunswick: Computerland 390-9095; East Hanover: Computer Factory 887-5711; Englewood: American Business Product 569-0853; Englishtown: Computer Madness 462-9696; CHI Systems 462-9696; Fairfield: Computer Discount 882-0039; Hasbrouck: Nubs Computer 288-6827; Iselin: Computer Factory 750-8810; Little Ferry: Warner Computer 641-7400; Livingston: Bambergers 994-2000; Mahwah: Micro Age 529-1400; Menlo Park: Bambergers 549-4400; Montvale: Computer Center 391-1006; New Brunswick: Clancy Paul 246-8585; Northfield: ComputerLand 646-6611; Ocean Township: Transnet 531-7020; Paramus: Bambergers 843-9100; ComputerLand 845-9303; Computer Factory 599-2700; Princeton: Clancy Paul 921-8500, 683-0060; Red Bank: Clancy Paul 747-7150; Stanhope: FCS 347-9006; Summit: StoneHenge Computer 277-1020; Totowa: Computer Factory 785-0088; Union: The Computer Factory 686-4555; Nynex/Datago 686-1660; Transnet 688-7800; Computerland 851-2858; Wayne: Bambergers/Willowbrook 785-9525; Computer Pro's 256-7070; West Trenton: Clancy Paul 771-1777; Westmont: Nubs 858-1774. **NM**: Albuquerque: C.L.I. Computers 883-0955; Computer West 897-2001; Rocky Mountain Computers 292-2775; Carlsbad: Computer Network 621-0937; Wayne: Computer Pros 256-7070. **NY**: Bronx: Nubs 828-4200; Brooklyn: Computer Factory 377-4999; Clifton Park: Lela Computer 383-0035; Colonie: Nynex/Datago 458-2222; Endwell: Nynex/Datago 754-9120; Garden City: Nynex/Datago 248-5075; Computer Factory 248-6700; Hauppauge: Computer Factory 360-7700; Hicksville: World Computers 822-1400; Nynex/Datago 933-1881; Huntington Sta.: B.C.Communications 549-8843; Little Neck: ComputerLand 423-5280; Malba: Dafax Computer 746-8220; Manhasset: Computer Microsystems 627-5240; Melville: Computer Factory 351-8460; Merrick: Byte Shop 379-2983; Middletown: Computer Emporium 343-8740; Nanuet: Computer Factory 624-8006; **NYC**: ComputerLand/Third Avenue 624-8006; ComputerLand/Seaport 608-2266; ComputerLand 213-1000; Computer Place 222-9536; Olden Computers 725-1234; Software Solution 608-9595; Computer Factory/52nd St. 664-0170; Computer Factory/Lexington 687-5000; 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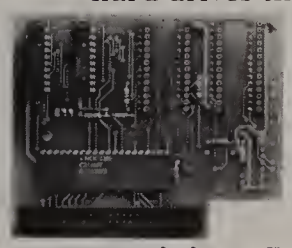
Hard disks that use the serial or floppy disk port, such as the Apple hard disk, are *slow.* The SCSI interface (introduced with the Macintosh Plus) is considerably faster. The DataFrame uses the SCSI interface, and consequently runs *much* faster than hard drives that use slower ports. Yes, even faster than non-SCSI internal drives. It really makes your Mac *fly.*



◀ (If you own a Mac 512, you can get DataFrame performance too, with our $99 SCSI adapter.)

Decision: Internal drives versus external drives?

Internal drives save desktop space, but there are serious trade-offs. First, you lose your system while the drive is installed. Worse, you lose your system if the drive needs repair. (Internal drives have earned a not undeserved reputation for frequent breakdowns.)

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Decision: Under-system or beside-system?

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SCSI means easy expansion—you can 'daisy chain' up to seven additional drives or other SCSI peripherals, using DataFrame's second SCSI port. Plus, DataFrame boots your system directly from disk, saving you time. And we used Apple's Hierarchical File System, so all 20 megabytes are available on line at all times. Most important, DataFrame is so reliable, we back it up with a full, one year unlimited warranty. That's confidence you can't even get from Apple.

The result of all these decisions:

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Operate	Go	Hit	Consume

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You've got quite a mystery to solve. And your hide to save. So don't wait for a formal invitation.

Examine	Open	Close	Speak
Operate	Go	Hit	Consume

Consume the kind of excitement you would do almost anything to avoid in the real world. Experience what *MacUser* called "...a complete breakthrough in gaming."

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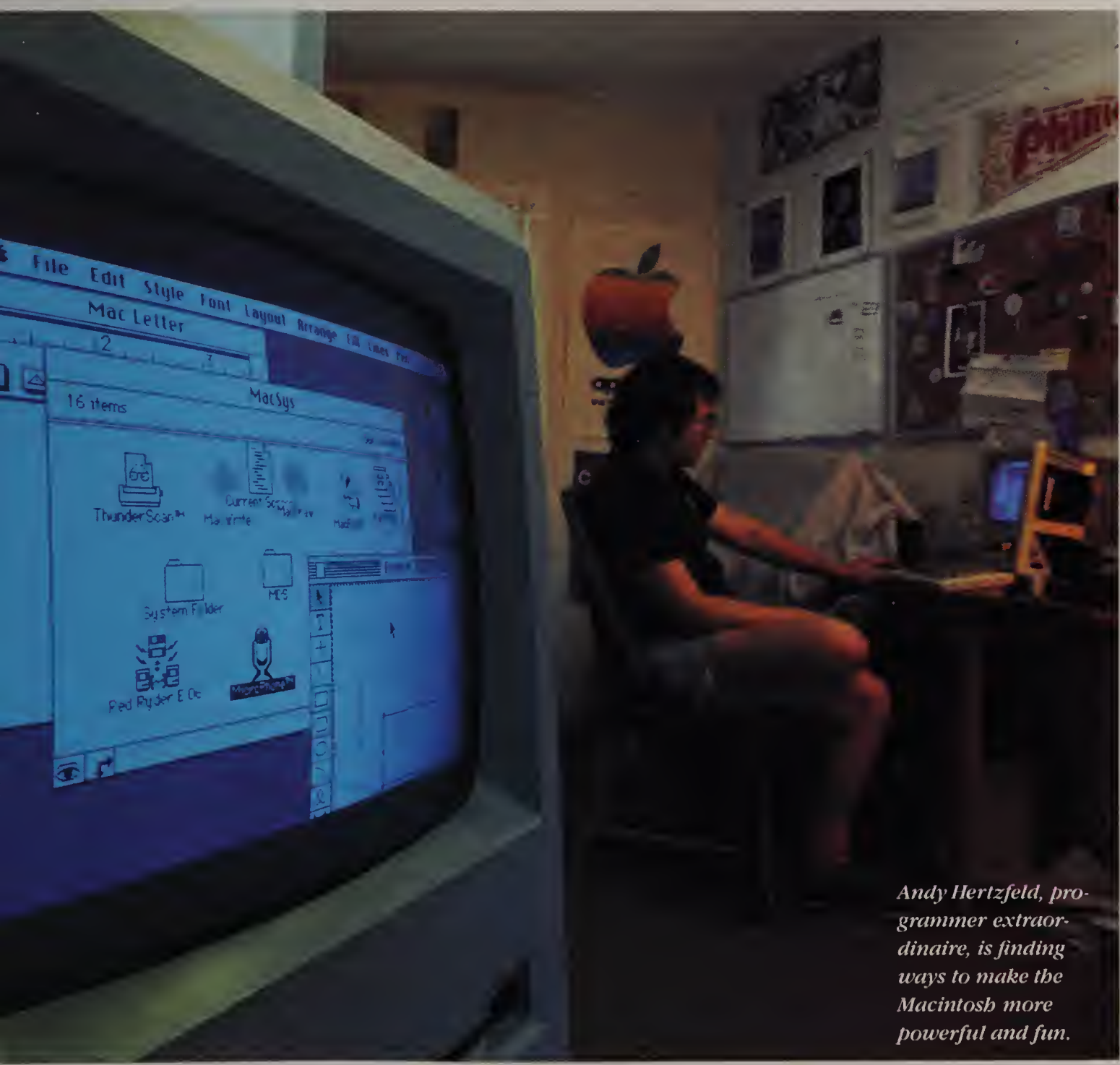
Macworld View

dBase Mac, Macintosh Programmers Workshop, Glue, Servant, and more

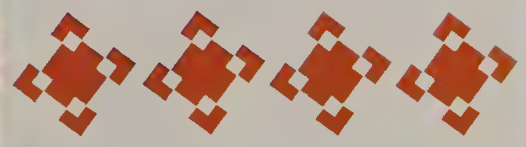
Edited by Daniel Farber



Andy Hertzfeld, programmer extraordinaire, is finding ways to make the Macintosh more powerful and fun.

LEE YOUNGBLOOD

Servant



Most members of the talented group that created the Macintosh are no longer at Apple, but some of them are still trying to fulfill their dreams for the machine. Among them is the original Mac Wiz, Andy Hertzfeld. He was a major developer of the system software, wrote the ThunderScan software, and is now working on a new Finder for the Macintosh called Servant.

Servant combines the functions of the Finder and the *Switcher* to let windows from different applications lie on top of one another. Up to seven applications can be opened at once. Servant also supports background printing and file transfer. And Servant is about twice as fast as the Finder.

Hertzfeld has also included some small details that reinforce the metaphor of real objects on a desk top. The desktop offers an icon editor that lets you create custom icons for any application, document, or folder, and the Trash Can lid opens when you drag something into it. When you drag an icon, it maintains its shape (the

(continues)

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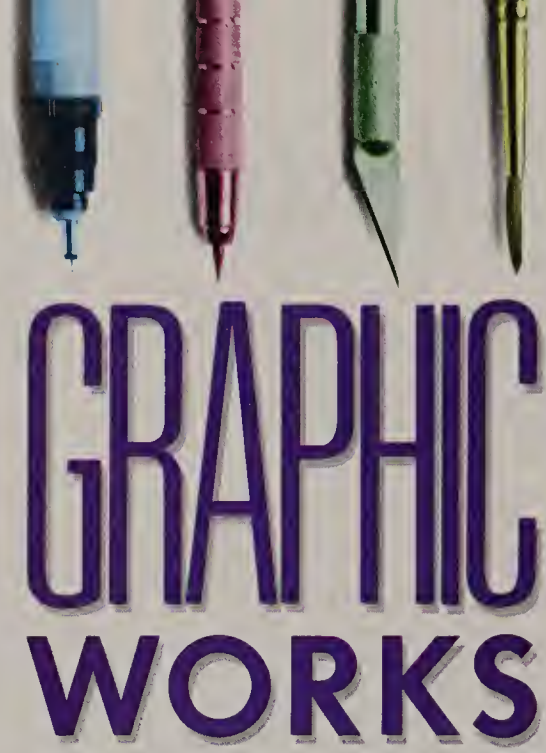

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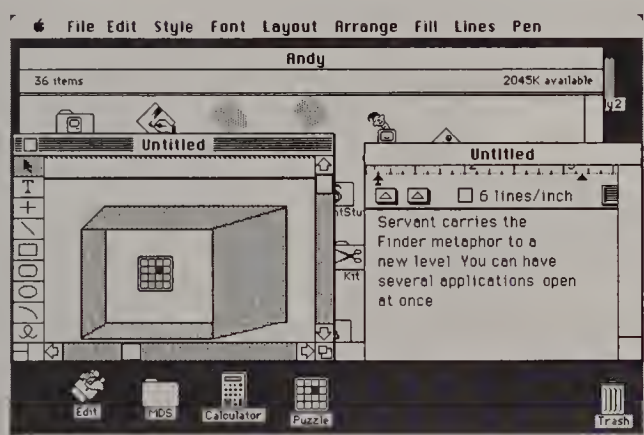
Servant (continued)

Finder defaults to the generic application icon outline). The desktop background can display any *MacPaint* document.

Servant windows differ somewhat in design from Finder windows. "Horizontal and vertical scroll bars are good for text documents, but they are constricting for graphics," Hertzfeld says. In Servant you move around the window with the hand cursor (the grabber in *MacPaint*). This allows you to move in any direction. And you can have an unlimited number of icons in the Servant window.

Servant's navigational tools help you find and keep track of items. A Show Page-like feature displays a reduced view of the contents of the window. You move the view rectangle to display different areas of the window. In addition, a set of arrows indicates where you are in the window. You click on an arrow to move in a specific direction within a Servant window. Although you cannot view the contents of windows by name, type, or size, Servant has controls that search for and sort icons.

Hertzfeld believes the Mac has drifted away from its user-oriented goal. "We need a way to modify the system while making it visible to users. *ResEdit* is certainly too difficult for the average user," he says.



Servant
Servant is designed to turn the Finder into a multiwindowing Switcher. *Several applications can be open on the desktop at once, and you can customize any icon.*

By showing system resources as icons, Servant builds on the foundation of the Finder's metaphor.

Another new concept in Servant is a scripting, or macro, feature that lets you set up complex operations that run automatically. Hertzfeld's plan goes beyond macro programs like *Tempo,* in which the program remembers the user's keyboard and mouse movements. Hertzfeld wants to create *puppet strings*—resources that developers would include in their programs which would allow Servant to interface directly with those programs.

The future of Servant is uncertain, however, with Apple having acquired nonexclusive rights to its technology. According to some sources, it's likely that Apple will adopt Servant's multiwindowing *Switcher* scheme and a few other features for a new version of the Finder. But under the agreement, Hertzfeld still has the right to publish his program. If Apple declines to use major parts of Servant, Hertzfeld will find a way to market it.

APDA

Apple recently created the Apple Programmers' and Developers' Association (APDA) to provide programmers with an efficient shopping service for development languages, tools, and technical documentation. The organization offers a way for people who aren't registered developers to get technical information and programmers' utilities.

APDA is initially being sponsored by Apple, but its implementation and administration will ultimately be handled by A.P.P.L.E. Co-op, an independent organization. APDA members receive quarterly newsletters and catalogs informing them of new products that can be ordered via a toll-free number. The APDA will also offer publishing and distribution services to third-party developers and publishers who have products targeted at programmers. For more information, contact the A.P.P.L.E. Co-op at 290 S.W. 43rd St., Renton, WA 98055, 206/251-6548.

The Two-Headed Macintosh

Radius, of Sunnyvale, California, has introduced a full-page screen for the Macintosh. The Radius Full Page Display (FPD) provides an 8½- by 11-inch image size and allows you to use the Mac screen at the same time. Created by Burrell Smith, designer of the Macintosh's digital electronics, FPD has nearly the same number of dots per inch as the Mac screen (the Mac has 72) for its 640- by 864-line screen. Thus, it maintains visual fidelity with the ImageWriter and LaserWriter printers.

The display is controlled by a digital board designed by Smith that fits on the Mac's digital board. It contains a 68000 microprocessor, which replaces the Mac's 68000, as well as 128K of RAM, and firmware. FPD doesn't require any software to run. The routines that control the monitor's user interface are encoded on the FPD board and were written by Andy Hertzfeld (see "Servant" in this column), Smith's co-worker on the Macintosh development team. The most clever part of Hertzfeld's contribution is the capability to move and even straddle windows between the two screens. For example, you can keep the Scrapbook or other desk ac-

(continues)

GEORGE STEINMETZ

The Radius Full Page Display provides an 8½- by 11-inch screen for the Macintosh. The screen has approximately the same resolution as the Macintosh's and allows you to move windows between the two screens.

The inventors of the 3.5″ drive recommend only one floppy disk.

Theirs.

If your computer has 3.5″ drives, it has a little bit of Sony. Because Sony invented the 3.5″ drive technology that has taken floppy disk memory all the way to two megabytes.

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But the best reason to trust only Sony is your irreplaceable data. After all, you'll be storing six times the information on a disk that's one-third smaller than a 5.25″ floppy. That's why we recommend only one floppy disk for our 3.5″ drives. The Sony.

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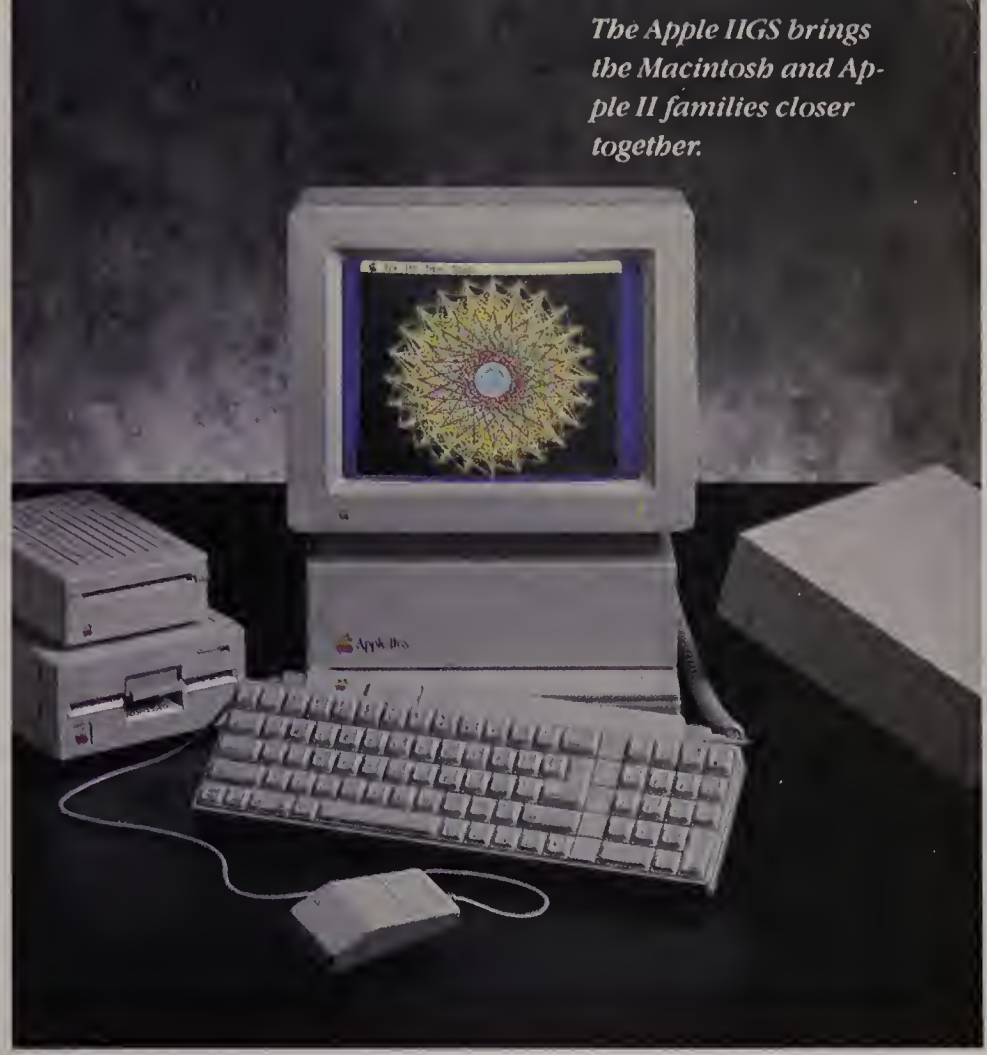
cessories on the Mac screen, and an unobstructed full-page window on the FPD screen.

A control panel lets you set up options tailored for the larger screen, including cursor size, mouse movement speed, and a screen-saver timer (which darkens the screen after a specified amount of idle time). FPD also provides an option to display menu titles and commands in a 16-point font, rather than the 12-point used on the standard Mac screen. In addition, applications such as *MacWrite* that don't use the zoom box for expanding and contracting windows can use zoom boxes with FPD. You can automatically resize full-page windows to fit on the Mac screen.

The $1995 FPD requires the new Macintosh ROM and works with most applications. Programs that make assumptions about the screen size, such as *MacPaint* and certain games, may not work perfectly on the big screen. FPD doesn't work with *Switcher* but will work with future Finders that incorporate *Switcher* technology. For more information contact Radius at 1050 E. Duane Ave., Ste. F, Sunnyvale, CA 94086.

Changing of the Guard

Assimilation has gone out of business, but the company's hardware offerings are now being distributed by their manufacturer. You can order Mac Turbo Touch, Numeric Turbo, MIDI Conductor, and Mac Port Adaptor from Cambridge Automation (20230 State Rd., Cerritos, CA 90701, 213/402-5389). The company has also taken on support responsibilities and will honor warranties for products purchased from Assimilation.



The Apple IIGS brings the Macintosh and Apple II families closer together.

GEORGE STEINMETZ

Craftspeople at Work

Apple has created the programmer's equivalent to the craftsperson's studio: the *Macintosh Programmers Workshop,* otherwise known as *MPW.* The *Workshop* is an integrated programming environment consisting of the *MPW* shell, an assembler, a linker, a make facility, a debugger, a resource editor, a resource compiler, and a decompiler, as well as numerous other utilities. Additional products available for *MPW* are a C compiler, a Pascal compiler, and a new type of application called *MacApp,* an expandable generic application that lets you build applications using object-oriented techniques.

The *MPW* shell performs many functions. First, it contains a window-based editor that incorporates the traditional Macintosh editing features. The command interpreter lets you execute commands interactively, or you can execute a series of commands stored in a shell script file. The *MPW* shell uses UNIX-like regular expressions and allows the redirection of input and output. In addition, you can run programs (called tools) under the control of the shell. *MPW* provides 24 such tools, including the assembler and the linker, but you can also write your own.

The *MPW* assembler generates code for the 68000, 68010, and 68020 microprocessors; the 68881 floating-point coprocessor; and the 68851 paged-memory management unit. The C compiler is a full Kernighan and Ritchie implementation with many extensions, including structure assignment and enumerated types. The Pascal compiler is an enhanced version of the Lisa Pascal compiler that adds object-oriented programming features to the language. Apple is scheduled to ship *MPW* late this year.—*Fred Huxham*

Apple IIGS

If the Apple II were human, it would be over 65 and ready for retirement. You'd hardly expect it to compete with new kids like the Atari ST and the Commodore Amiga. But Apple Computer recently announced the Apple IIGS (*GS* for *graphics and sound*), revitalizing the venerable Apple II with more speed, more memory, better graphics, and better sound. These improvements make the IIGS no less an Apple II. Compatibility with existing Apple II software and hardware accessories was the number one design goal. As Apple president John Sculley puts it, "This is the first time a product as different as this has been introduced that already has a built-in base of 10,000 applications."

The IIGS uses a 16-bit microprocessor, the 65C816, which runs at more than twice the speed of its predecessor, the 65C02. The IIGS comes with 256K RAM and 128K ROM memory—expandable to over 4 megabytes and 1 megabyte, respectively. Although its seven expansion slots are compatible with most existing Apple II accessory boards, you won't need many of them; the machine comes with six built-in ports for attaching a pair of 3½-inch disk drives, a pair of 5¼-inch disk drives, two serial devices, game controls, a mouse, and an RGB or composite video monitor. A detached keyboard plugs into the same port as the mouse. The serial device port supports the AppleTalk network. Also included as standard equipment is a 16-voice digital sound synthesizer with its own 64K memory.

Two new graphics modes, with palettes of 4096 colors, augment the display modes of

(continues)

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FAST; Up to **ten times** the speed of the MacPlus floppy drive! Up to **six times** faster than other hard drives utilizing the floppy port! The SCSI-driven S-20+ provides rapid program loading and data transfer at 937,000 bytes per second. With the S-20+ and popular software such as Page Maker™, the MacPlus user can produce newsletters and other communications in no time.

EASY; Less than five minutes from box to operation! The S-20+ software allows the same simple operation of the icon as does the floppy drive for fast & easy file copying and manipulation.

MASS STORAGE CAPACITY; No manipulation of diskettes means increased efficiency and productivity! This 20 megabyte, formatted, external subsystem holds the equivalent of about 6,000 double-spaced pages or 25 floppy disks.

COMPACT; The MacPlus user can enjoy the benefits of the S-20+ without giving up valuable work space. Designed to complement the external styling of the Apple hardware, the S-20+ sits neatly under the MacPlus.

DAISY-CHAINABLE; The S-20+ comes with two SCSI interfaces which allow daisy-chaining of up to seven Peachtree Technology SCSI peripherals on the same bus.

Apple had the vision.
We took advantage of it.
For more information, call Bill Daniel, Director of Sales, at (404) 662-5158.

The New S-20+ (rear view)

Peachtree Technology, Inc.

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Circle 564 on reader service card

Apple IIGS (continued)

earlier Apple II models. Resolution is 320 by 200 pixels with 16 colors per scan line or 640 by 200 with 4 colors. When combined with tricks like blending two colors by displaying them side by side, these modes allow the IIGS to display very lifelike pictures on a high-resolution RGB monitor.

Many of the IIGS's enhancements are software tools: a Finder, desk accessories, and the promise of new applications with Macintosh-like user interfaces. Developers will create those applications using the IIGS toolbox, which includes QuickDraw II and management routines. Apple "evangelists" are encouraging both Mac and Apple II developers to apply their special knowledge and experience to the new machine and to develop software for the IIGS.

To some observers, the Apple IIGS blurs the distinction between the Mac and Apple II families. But while the IIGS has some features of the long-awaited color Mac with slots, the IIGS has neither the Macintosh's processing power nor its screen resolution. More important, as Sculley points out, "We are making leaps in Mac architecture, so you must compare the features of the GS and the Mac in terms of where Apple is going, not where it is now."

Apple sees a clear position for the IIGS in the middle of its product line. Priced below it are the IIe and the IIc; above it are the Mac 512K and the Mac Plus. The lower-priced machines are for people interested in education and entertainment, while the higher-priced machines are geared to those involved in business and productivity.

Owners of Apple IIe and II+ machines, especially the 1 million used in schools, will be glad to learn that Apple has not forsaken them. They can upgrade their machines to full GS capability by exchanging the main circuit board and back panel.

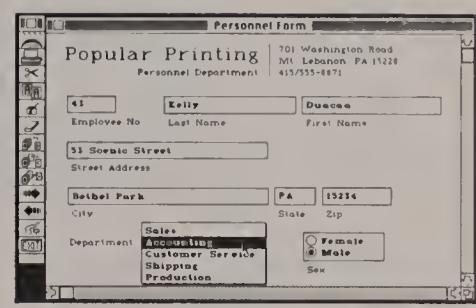
"Apple II Forever" seemed like nothing but marketing hype when Apple first used it to introduce the Apple IIc two and a half years ago. The slogan takes on new meaning, though, with the introduction of the Apple IIGS. Sculley sums up the IIGS this way: "It's what the market wanted. It has all the features of the Commodore Amiga and the Atari ST plus an upgrade path and a clear position in our product line."—*Lon Poole*

dBase Mac

In 1980 entrepreneurs George Tate and Hal Lashley saw promise in a database manager called *Vulcan,* which boasted a total of 60 users. They changed the program's name to *dBase II* and formed a company, Ashton-Tate, to market the product. *dBase II* quickly grew from its CP/M operating system origins to run on MS-DOS computers like the IBM PC. It's since evolved into the more powerful *dBase III* and *dBase III Plus,* part of a line of business software that created a software industry giant.

The Torrance, California, firm didn't exactly leap into the Macintosh software market, however. Microsoft and Lotus, its rivals in the software titan league, committed themselves to developing Mac software early, while Ashton-Tate concentrated on the IBM PC. Some wags quipped that the company's only Macintosh products were books.

Ashton-Tate changed all that, however, with the announcement of *dBase Mac*—a relational database manager with a programming language that lets developers create data



dBase Mac
Ashton-Tate's dBase Mac *provides unique field types and formatting options. Shown here are two choice fields, which let you use buttons or pop-up menus to select options.*

management applications tailored to specific business needs.

Ashton-Tate hopes *dBase Mac* will appeal to *Omnis 3* and *Double Helix* users. The product's specifications are impressive: 36 files can be opened at once (versus *Omnis 3*'s 12 and *Interlace*'s 15), and an application can simultaneously display up to 16 forms and reports. *dBase Mac* provides seven field types. Among the more interesting are picture fields for storing graphic data; logical fields for holding true-or-false values; and choice fields, which hold buttons or pop-up menus that offer several permissible options. These talents combine with *MacDraw*-like form-design features; a Database Structure window that, like *Interlace*'s Overview window, shows how files relate to each other; and a programming language that lets you create procedures for updating files, transferring and checking data, performing calculations, and displaying dialog boxes.

Ashton-Tate also hopes to win over people who have outgrown simple filers like *Microsoft File* and *FileMaker; dBase Mac* provides several "quick create" options that create preset form and report designs with only a few mouse clicks. And not only does the program read data files created by its siblings *dBase II* and *dBase III,* but its preprogrammed script files convert databases from over a dozen Mac products.

At an announced price of $495, *dBase Mac* isn't likely to replace less capable but more economical relational products like *Interlace* and *OverVue. dBase Mac* should appeal to users with demanding tasks, however, and Ashton-Tate's entry into Mac software may help the Mac infiltrate PC-dominated corporations. At the very least, *dBase Mac* will inspire some strategy meetings at Blyth Software and Odesta. Ashton-Tate's late arrival at the Mac data management party will probably turn quite a few heads.—*Jim Heid*

Portal to the City

To the uninitiated, exploring an on-line service can be a formidable task. Unlike the Macintosh's desktop metaphor, services like GEnie, CompuServe, and The Source rely on a series of multiple-choice menus to guide novice explorers through the maze of options. More experienced users can type commands to get from place to place. But navigating through a text-based service devoid of visual and aural guideposts is like exploring Manhattan by reading a travel guide inside a windowless taxi.

Portal, a program from Virtual Space Software (VSS), promises to change all that and make on-line exploration as intuitive as following a map. In fact, a map of the United States

(continues)

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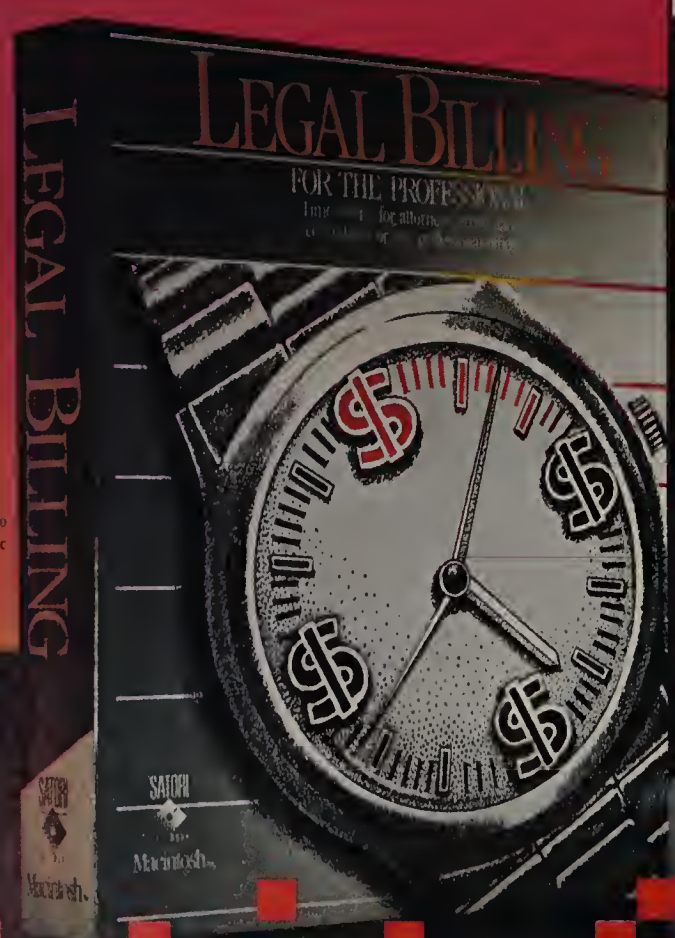

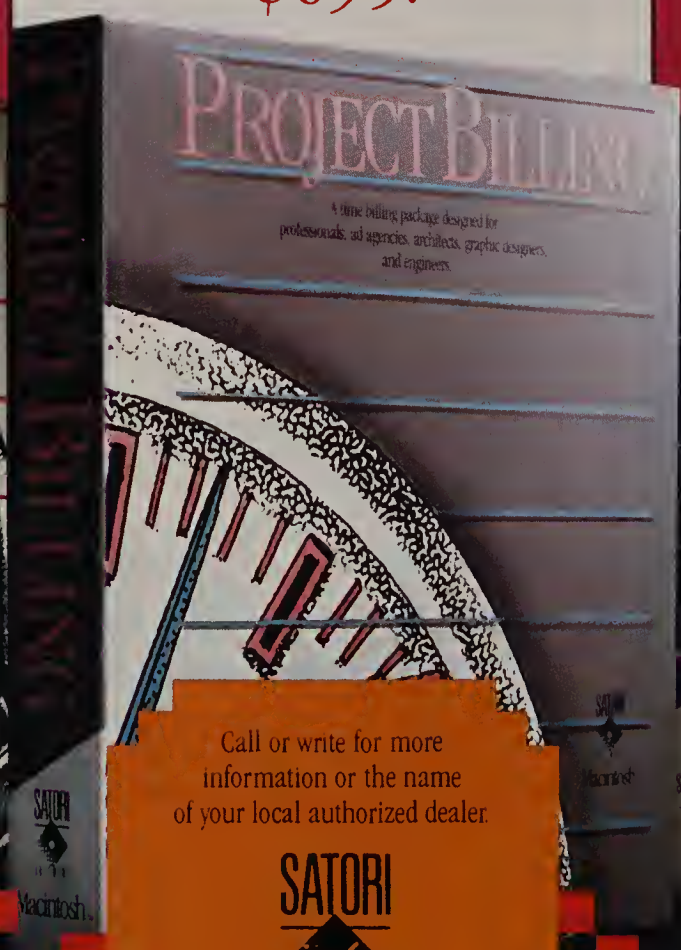

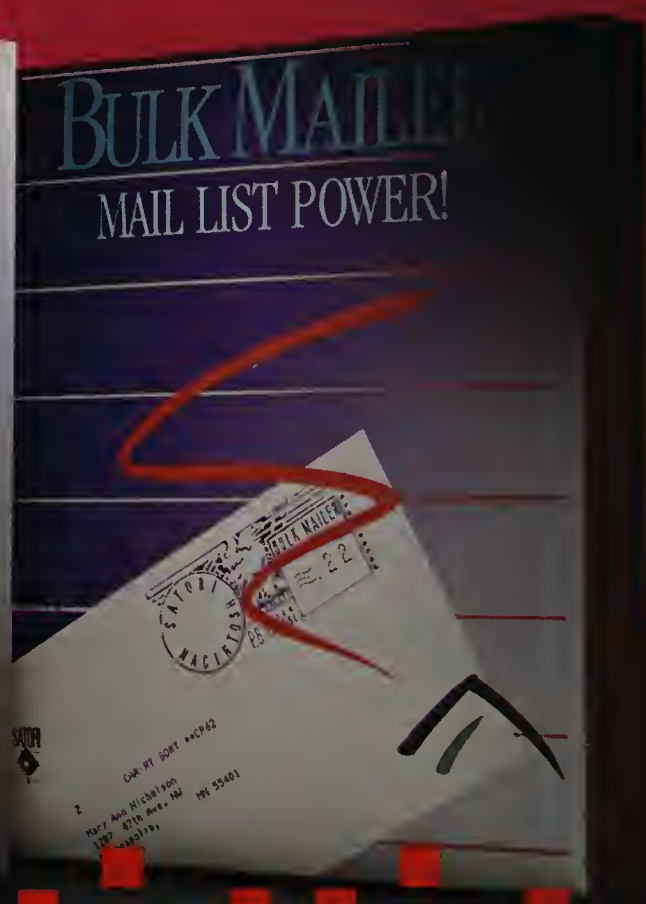

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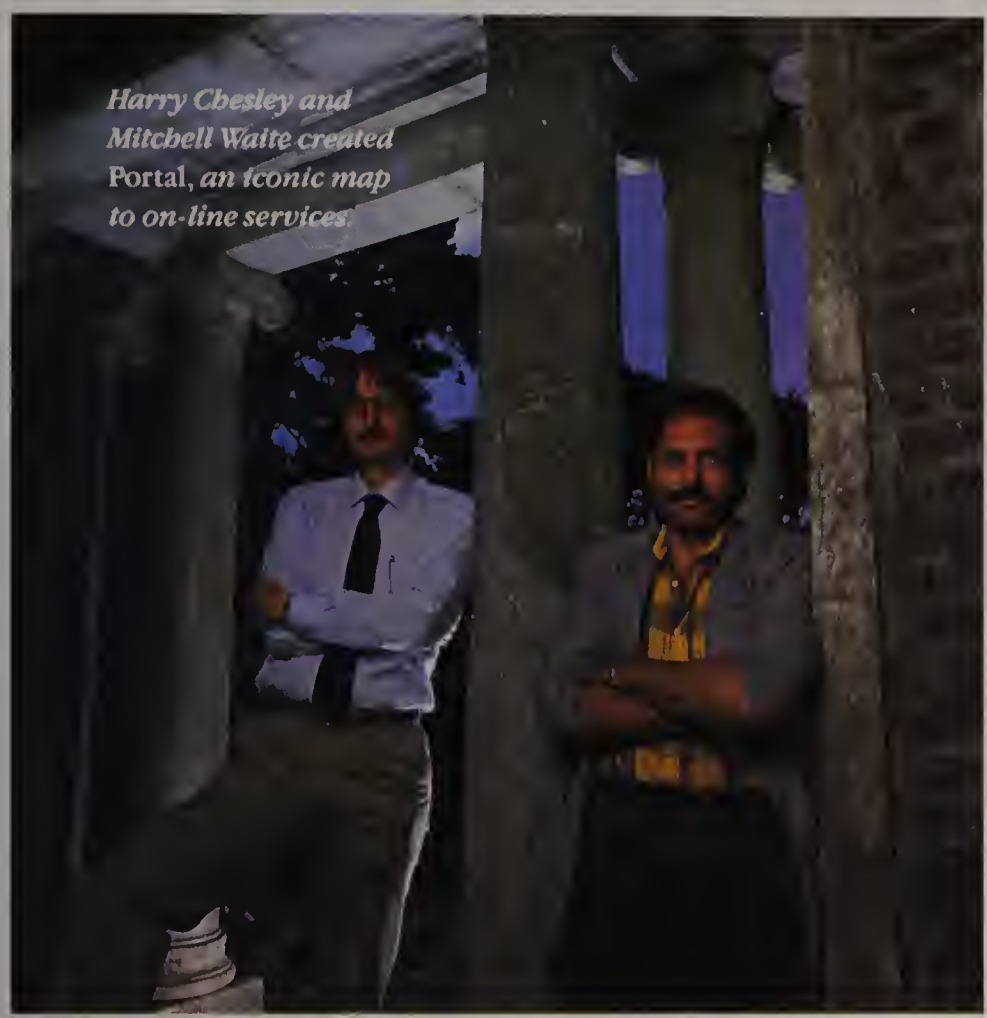


Harry Chesley and Mitchell Waite created Portal, *an iconic map to on-line services.*

GEORGE STEINMETZ

Portal to the City (continued)

is what you see when you start the program. But instead of cities, the country is dotted with the names of bulletin boards and commercial information services. You log on to a service or a bulletin board by simply double-clicking on its name.

Once connected, you see an aerial view of the on-line city. City blocks bear the names of the services they represent. As you would expect, when you double-click on a block, you see a close-up view of a building with doors that represent different options or categories. Double-click on a door and you enter the building. Once you are inside, you can drag objects like magazine articles, drawings, and software from a shelf into your shopping cart, at which point *Portal* automatically downloads the information to your Mac.

Of course, a building can just as easily house a database supermarket as it can an on-line conference center. VSS's *VCO+*, an outgrowth of the *VCO* (Visual/Voice Conferencing) software found on GEnie, Delphi, and the Well, is one possible occupant.

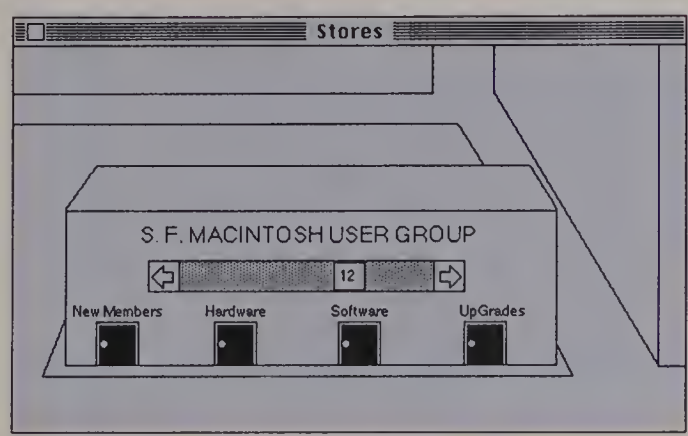
Opening the door to *VCO+*'s conference center leads you into the lounge, a hallway filled with doors leading to various conference rooms. Once inside a conference room, you see the heads of the other participants. When participants speak, their faces appear at the front of the room, and their words (via *Macintalk*) accompany the text of the message.

VCO+ contains its own face editor so that you can design your own faces. The design process involves picking and choosing from a variety of eyes, noses, mouths, and so forth, to show different emotions.

VSS will market *Portal* and *VCO+* to existing information services, according to Harry Waite, president of VSS. In fact, *VCO+* is currently being tested in conjunction with PacTel's Project Victoria, an experimental telecommunications service.

One advantage of *Portal* is its independence from the host computer's software; *Portal* creates its visual metaphor on the Mac without requiring any modifications to the host. And the metaphor is not limited to a city block. *Portal* can just as easily transform an information service into a book or an Alice-in-Wonderland-like fantasy.

Although Waite has not finalized any agreements, he expects *Portal* to be on a major commercial service by the end of the year. For more information, contact Virtual Space Software, 3220 Sacramento St., San Francisco, CA 94115, 415/929-8762.—*David Ushijima*



Shopping on line with Portal *is as easy as clicking on an object and dragging it into the shopping cart.*

Tools for Learning

Learning Tool is a new educational program especially designed for organizing notes, prepping for exams, and composing research papers. Based on principles of cognitive psychology, *Learning Tool* has three levels of information. You can enter key concepts or terms in a Master List, or you can enter them as titles of icons representing note cards. You can position note cards to show relationships among concepts, and link them with arrows to represent specific types of relationships, such as examples or parallelisms. You can also create nested sets of information by dragging one note card onto a related note card.

Clicking on a note card opens a window that includes text or graphic information for the key concepts. The program has some simple drawing tools, including a spray can; a pencil; and line, box, and oval tools. *Learning Tool* also lets you create self-tests to increase your understanding of the material and to prepare for exams. However, the program does not evaluate answers. For more information, contact Arborworks, Inc., 2540 Pittsfield Blvd., Ann Arbor, MI 48104, 313/973-0628.

Desktop Publishing Glue

Solutions has introduced a new program that simplifies the process of transferring graphics from almost any Macintosh application into page-composition programs such as *PageMaker, ReadySetGo,* or *MacPublisher II.* Previously only *MacPaint* or *MacDraw* documents could be imported directly to those programs. Aptly named *Glue,* the program also has a print-to-disk feature. Once a graph, a spreadsheet,

(continues)

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Desktop Publishing Glue (continued)

or a database report is saved on disk, images can be copied into a newsletter or a document being created with *MacWrite, Word,* or other types of programs. In addition, a document saved on disk—for example, a newsletter created with a desktop publishing program—can be read on screen or printed out by *Glue,* even when the master application is not on that disk. Images are not limited by the size of the Mac screen. The $49 program is available from Solutions Inc., P.O. Box 989, Montpelier, VT 05602, 802/229-0368.

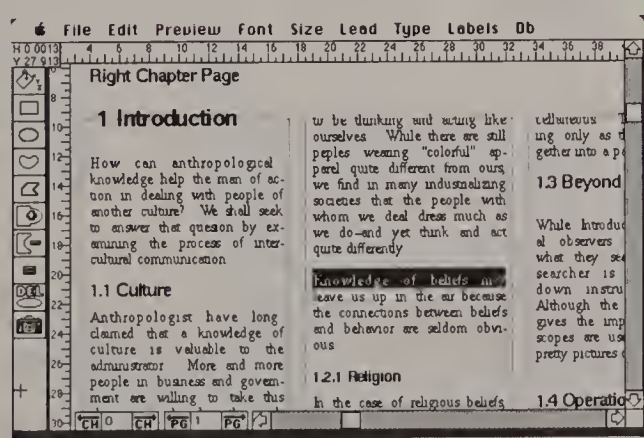
Desktop Publishing Software

The newest entry in the desktop publishing software field is *PS Compose,* from PS Publishing. This program combines full typesetting (a superset of the MCS Compugraphic system) with an editable WYSIWYG display. You can input typesetting commands within the document or compose pages by laying out the elements on screen. As you modify typesetting codes, the WYSIWYG screen automatically incorporates the effects of those changes, and vice versa.

Robert Simon, product manager for *PS Compose,* says the program is aimed at professional typesetters and users who have rigorous typesetting requirements. The code-based mode offers control over tables, superscripts and subscripts, forward and reverse leading, rule placement and measurements, character spacing, fractions, and vertical pagination justification. Other features include style sheets, automatic indexing, hyphenation and justification (1200 characters per second on a 512K Macintosh), floating variable references, and kerning.

The program lets you specify any size paper, and you can draw arbitrary regions and flow text into or around those regions. You can create files with a word processor and tag specific elements for automatic page casting using the style sheets. You can use PostScript commands to manipulate text and to assign gray levels and resolution to scanned images. *PS Compose* works with PostScript printers and with typesetting machines from Compugraphic and Allied Linotype.

PS Compose is priced at under $1000 for a version compatible with PostScript printers and at around $2000 for a version with both typesetter and PostScript support. For information contact PS Publish, 290 Green St. #1, San Francisco, CA 94133, 415/433-4698.



PS Compose
The WYSIWYG page display is translated automatically into typesetting codes, which can be edited in a separate window.

Macworld Best-Seller Software

This month	Business	Last month	Months on chart
1	Microsoft Word, *Microsoft*	2	15
2	Microsoft Excel, *Microsoft*	1	7
3	PageMaker, *Aldus*	3	3
4	MacDraw, *Apple Computer*	4	12
5	Microsoft File, *Microsoft*	6	14
6	Microsoft Chart, *Microsoft*	12	14
7	Jazz, *Lotus Development*	11	11
8	MacDraft, *Innovative Data Design*	10	1
9	Omnis 3, *Blyth Software*	–	5
10	Sidekick, *Borland*	7	1
11	Dollars and Sense, *Monogram*	8	15
11	Helix, *Odesta*	–	8
11	MacProject, *Apple Computer*	13	12
11	OverVue, *ProVue Development*	15	3
12	Microsoft Multiplan, *Microsoft*	5	15

Source: InfoCorp survey of over 200 retail stores

Software Watch

Editors' choice: other recent software of particular interest

ComicWorks, *Mindscape*
Graphics

Cricket Draw, *Cricket Software*
Graphics

LightspeedC, *Think Technologies*
C compiler

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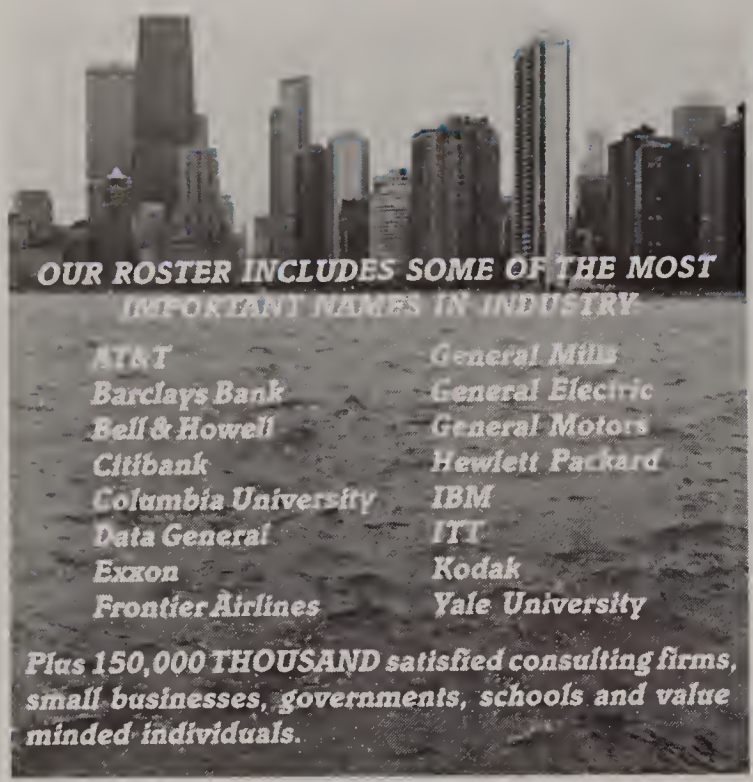

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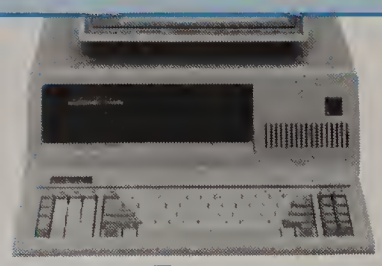

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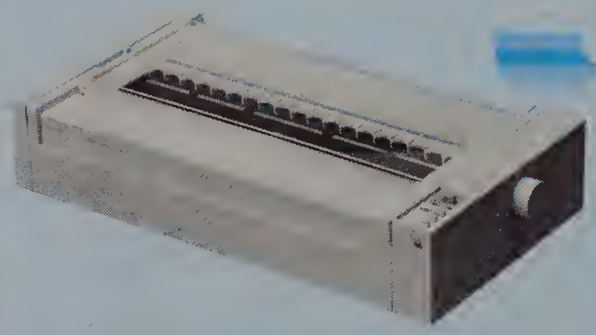

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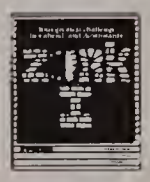

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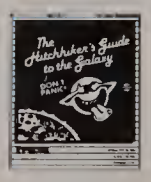

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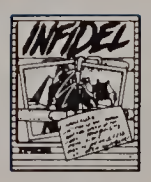

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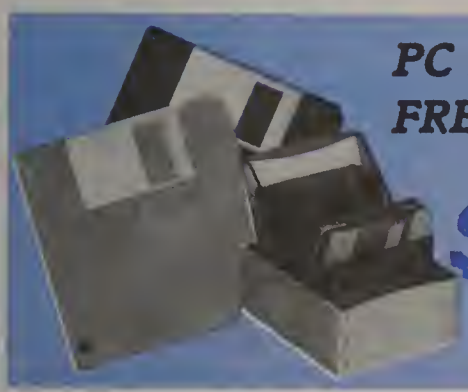

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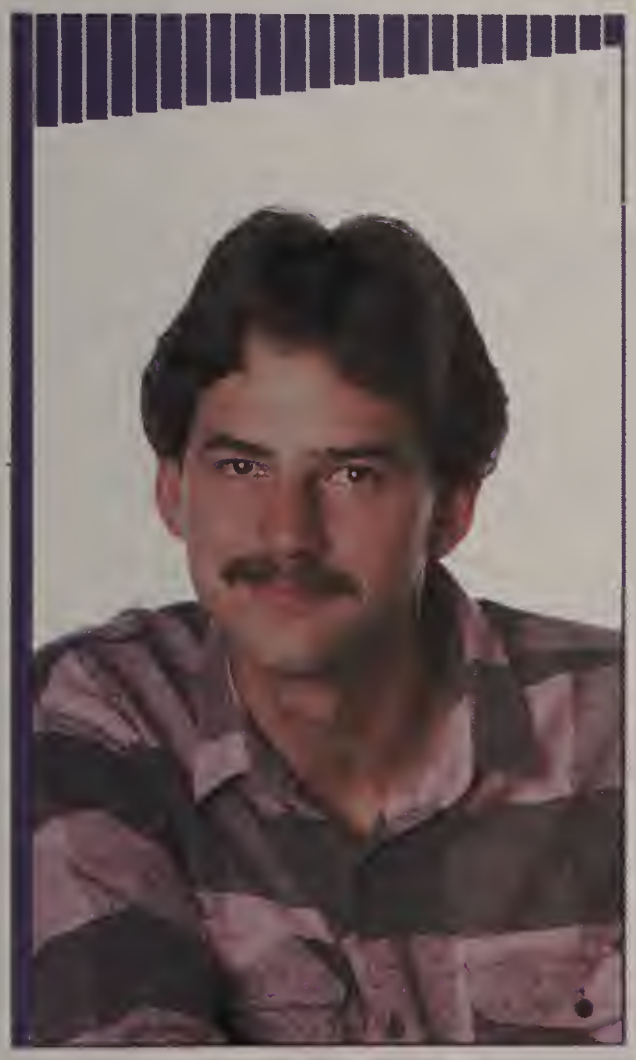
Get Info

Jump-starting a RAM disk, updating start-up disks, finding your way around the MiniFinder, and more tips

Lon Poole



'To address a regular business envelope, make all the settings in your word processing program.'

This month a reader asks for help setting up a RAM disk. Another reader recently upgraded to the Mac Plus ROM but has had trouble updating his 400K start-up disks with new versions of the System, Finder, and ImageWriter files. Others seek techniques for addressing envelopes with an ImageWriter and clarification of the distinctions between the Finder and the MiniFinder.

RAM Disk Trouble

Q. After reading Danny Goodman's "Developing a Megabyte Strategy" in the April 1986 *Macworld,* I downloaded *Ramstart* from CompuServe to create a faster system. However, when I made a RAM copy of my start-up disk, the 225K System Folder was not copied into the 310K RAM disk, and the start-up disk did not automatically eject. I manually copied the System Folder onto the RAM disk but still could not reassign it as the start-up disk. I am using a Mac 512K, Finder 4.1, and an Apple 400K external disk drive. What am I doing wrong?

Alan R. Krauss
Plainfield, Illinois

A. *Ramstart* ejects the start-up disk only if it copies a System file and the Finder to the RAM disk it creates. *Ramstart* automatically copies everything from the folder it's in to the RAM disk it creates. Thus, if you want to copy the entire System Folder to the RAM disk automatically, put *Ramstart* in that folder. Don't be surprised if you don't find a System Folder when you open the RAM disk; *Ramstart* places the System file, the Finder, and most other files from the System Folder into an unnamed folder on the RAM disk.

Versions 1.21 and 1.22 of the program have a script feature (described in the online help) meant to provide control over which files are copied onto the RAM disk. However, I've had trouble getting it to work reliably, so I stick to the same-folder method.

Versions 1.0, 1.21, and 1.22 of the program don't work quite right with disks that use the Hierarchical File System (HFS). For *Ramstart* to copy files automatically from an HFS disk to the RAM disk, you must position *Ramstart* and the contents of the System Folder outside of folders—in the disk directory window or on the desktop. Version 1.22+, floating around the user-group circuit, seems to work with HFS folders, though it reportedly has some idiosyncrasies. It may become confused if you change the contents or organization of the folder that contains *Ramstart* on the HFS disk, forcing you to create a brand-new folder, move everything into it, and discard the old folder.

If you're using a RAM disk, consider installing Jan Eugenides's public domain desk accessory, *CrashFix,* which lets you resume the Finder without losing your RAM disk and without restarting the Mac. Choose *CrashFix* once each time you start an application. Then if a system error occurs, you can restart the Finder by pressing the Mac's Interrupt button, the one to the rear of the Reset button on the programmer's switch. The *CrashFix* safety net succeeds most of the time, but some problems cause repeated system errors, in which

(continues)

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case you're out of luck. You can get *CrashFix* from user groups; try BMUG at 1442A Walnut St. #62, Berkeley, CA 94709, 415/849-HELP.

Updating 400K Start-Up Disks

Q. I upgraded my Mac 512K to 128K ROM and added a double-sided disk drive and was looking forward to consolidating several of my *Multiplan* disks onto one 800K disk. I have been unable to install the Mac Plus software on my *Multiplan* master disk due to insufficient space. I copied *Multiplan* to an 800K start-up disk but was unable to open worksheets because there was "not enough memory," even though the title bar said 190K was available.

Charles A. Kilvert
Providence, Rhode Island

A. Upgrading to the new System, Finder, and ImageWriter files requires more than 40K of additional disk space. As you've discovered with *Multiplan,* not all single-sided (400K) start-up disks have that much space available. You may be able to free enough space on a 400K disk by removing needless fonts and desk accessories with the Font/DA Mover and by shortening or removing the Scrapbook and the Note Pad. If the disk contains utility programs, help files, or other luxuries, get rid of them to liberate more disk space—just be sure you keep a copy on another disk of whatever you remove. For example, removing Multiplan Help and Multiplan Hard Disk Install from the *Multiplan* master disk frees 58K.

Should you be unable to eke out enough space on your single-sided disk, you'll have to copy it to a double-sided (800K) disk. In doing so, however, you will probably run afoul of a copy-protection scheme. Most applications, including *Multiplan,* let you copy the master disk but insist that you briefly insert the master when you start the application from a duplicate disk. It's possible to create a duplicate master on an 800K disk with *Hard Disk Util* from FWB Software (2040 Polk St. #215, San Francisco, CA 94109, 415/474-8055). Keep in mind that doing so may be technically illegal and that distributing duplicate masters to friends, co-workers, or others is piracy.

The out-of-memory message you see when trying to open *Multiplan* documents has nothing to do with the disk space reported on the title bar. Opening a document requires space in the 512K of memory inside the Mac. You may be out of memory because the new 128K ROM of the upgrade appropriates more memory for system use, leaving less for the application program and documents. A more likely culprit is the disk cache feature, which can drastically reduce available memory. Try quitting the application, turning off the disk cache on the new Control Panel, and restarting the application.

ImageWriter Envelopes

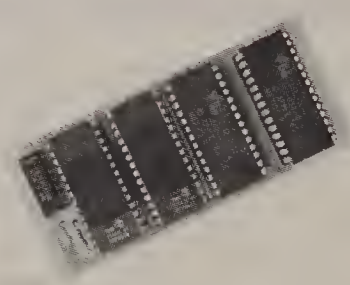
Q. How can I adjust my ImageWriter to print envelopes?

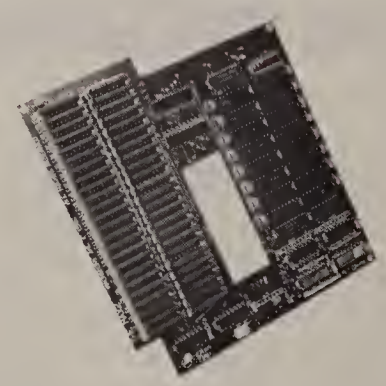
August J. Ponstingel
Woodbridge, Virginia

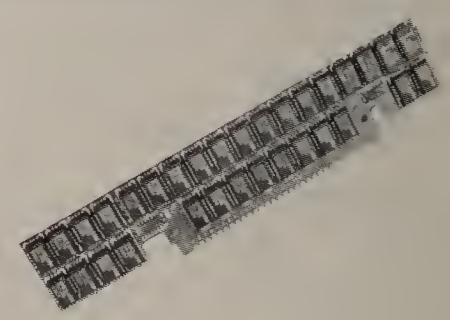
A. The ImageWriter doesn't need any adjustment to print the recipient's address on a regular business envelope. You make all the settings in your word processing program. Use *MacWrite* or *Microsoft Word* as follows:

(continues)

Max Production







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• Select all lines of the address at the beginning of the letter and choose Copy from the Edit menu.

• Scroll to the end of the letter, click an insertion point, and start a new page there for the envelope. In *MacWrite* choose Insert Page Break from the Format menu. In *Microsoft Word* press Shift-Enter.

• Prepare to format the address. In *MacWrite* choose Insert Ruler from the Format menu. In *Microsoft Word* choose Show Ruler from the Edit menu.

• Press Return seven times to create seven blank lines at the top of the envelope.

• Choose Paste from the Edit menu, putting a copy of the address on the new page.

• Drag the left margin marker to about the 3½-inch mark on the ruler. In *Microsoft Word* select the entire address before dragging the marker. The copied address shifts to the right, lining up with the new position of the marker.

• Change the size of the address to 12- or 14-point if you prefer, even if the letter itself uses a smaller size.

If you need to, you can now go back and change the letter without affecting the position or accuracy of the address that will be printed on the envelope.

When you print the letter, be sure to select the Cut Sheet or Hand Feed option. As you print, a dialog box advises you each time you must insert another sheet of paper into the printer. After you have printed the last page of the letter, put an envelope in the printer instead of a sheet of paper.

You may have to experiment at first to properly position the address on the envelope. Adjust the left/right alignment of the envelope in the printer, reposition the margin marker in the formatting ruler, and increase or decrease the number of blank lines above the address to get the results you want.

This method for addressing envelopes does not work well if the document uses headers, because they print on the envelope as well as on the pages of the letter. If you have headers in your letter, you can still print the recipient's address on the envelope by putting the address in a separate document.

Printing a return address on an envelope is not as easy as printing the recipient's address. On the ImageWriter it's hard to print closer than ½ inch from the top edge. And with *MacWrite* you can't print the address less than ¾ inch from the side of the envelope unless you fold the envelope. (With *Microsoft Word* you can get closer to the side.) If you're determined to try printing the return address, proceed as described earlier, substituting the return address for three or four of the blank lines at the top of the envelope "page." The return address and the recipient's address require different margin marker settings, so you need two sets of formats. Position the margin marker for the return address as far to the left as possible, and put the marker for the recipient's address at about the 4-inch mark.

Finder and MiniFinder Confusion

Q. When I quit *MacWrite,* I see the *MacWrite* icon by itself in a white panel covering the left two-thirds of the screen and buttons labeled Finder, Open, Open Other,

(continues)

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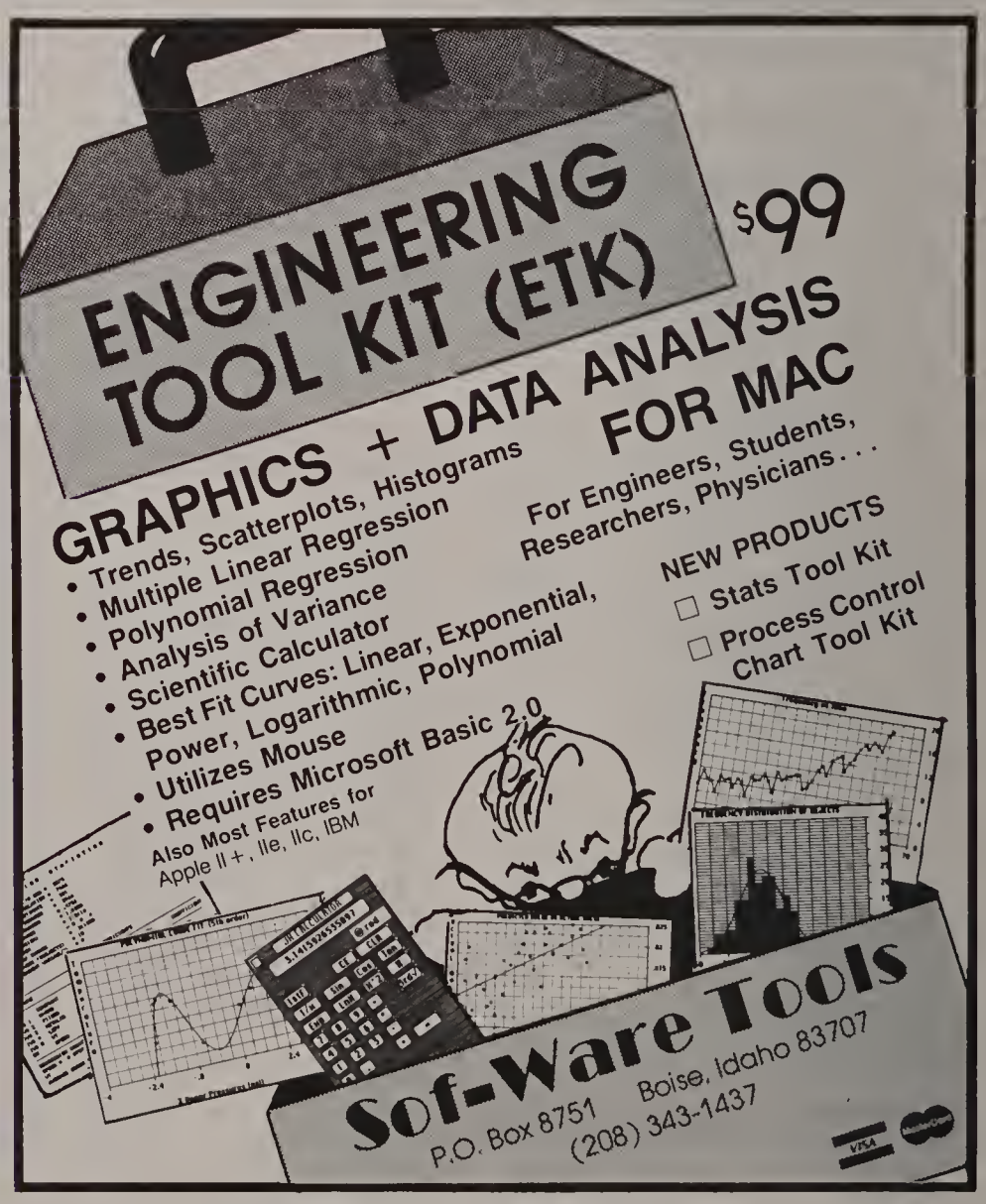

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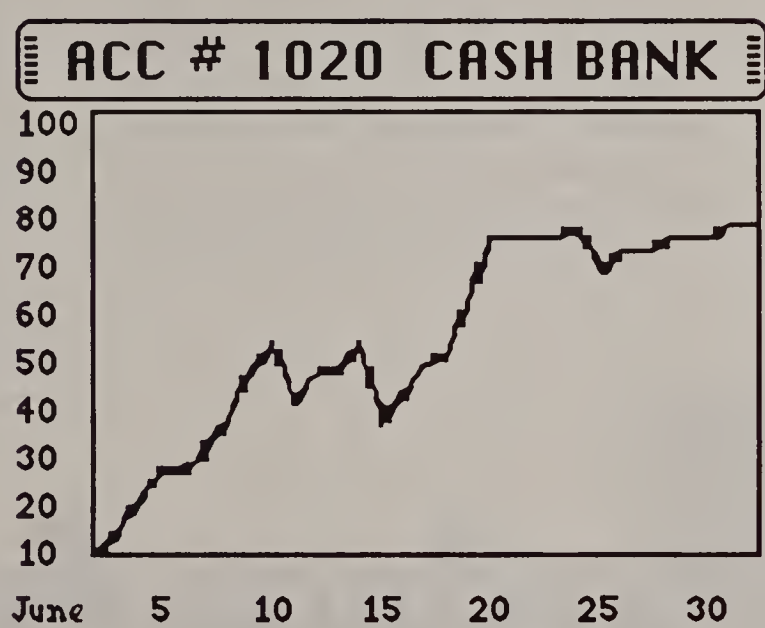

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Circle 523 on reader service card

Eject, Drive, and Shut Down on the right third of the screen. I want to see the screen with the disk icons and the trash icon. How can I do this?

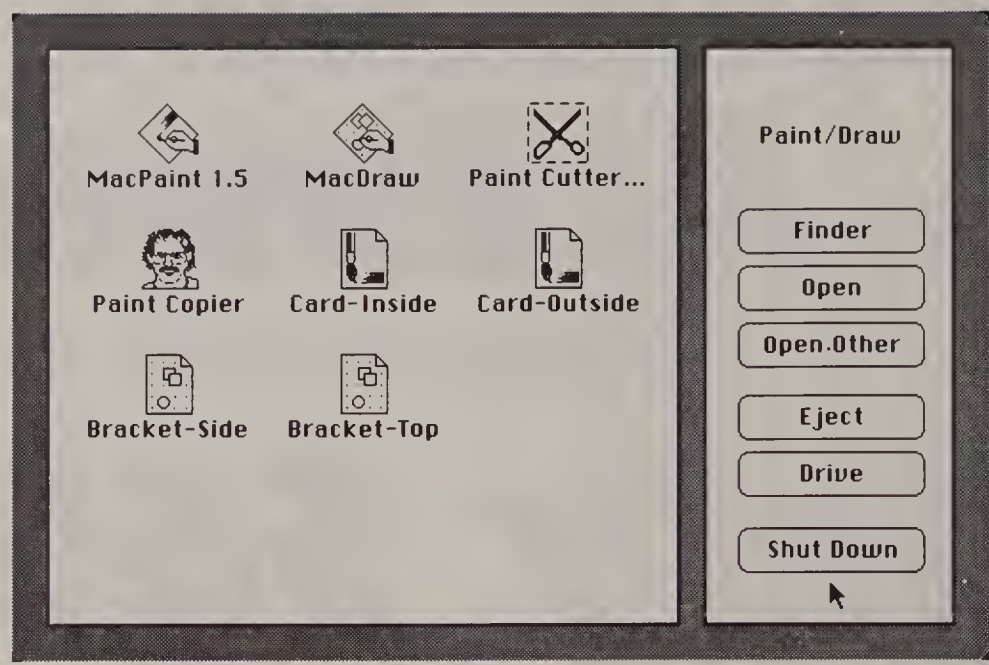
Philip Baumeister
Loomis, California

A. The white panel you describe is the MiniFinder, and what you want is the Finder (see "MiniFinder"). To reach the Finder from the MiniFinder, click the button labeled Finder. You can also bypass the MiniFinder and go directly to the Finder by pressing the Option key when you choose Quit from the File menu in *MacWrite* or any other application.

The MiniFinder expedites moving between the applications and documents you use most often, typically shaving 10 to 15 seconds off the time it takes to start the Mac or quit an application. However, the MiniFinder gains speed by giving up the versatility of the Finder, as you've probably noticed.

You install a MiniFinder with the Finder. First, select the icons of up to 12 applications and documents you want to have immediately available. All these icons, including the icons of the applications required to open any documents you select, must be in the same window. After selecting the icons, choose Use MiniFinder from the Special menu. In the dialog box that appears, click the Install button. A MiniFinder icon is created on the same disk as the selected icons; on an HFS start-up disk, it automatically goes inside the System Folder. (For a way to use more icons in the MiniFinder, see the sidebar in "A Hierarchy and 20 Megabytes," *Macworld*, January 1986.)

To remove the MiniFinder, choose Use MiniFinder from the Finder's Special menu, and click the Remove button in the dialog box that appears. Or use the Finder to locate the labeled MiniFinder icon on your *MacWrite* disk, and drag that icon to the trash.



MiniFinder
The speedy MiniFinder displays the icons of up to 12 documents and applications and lets you open one by double-clicking its icon. Using the MiniFinder's buttons, you can also switch to the Finder, open other applications from a standard Open dialog box, eject disks, change drives, and shut down.

Infocom introduces four new gam

Infocom,™ the crazy people who brought you "Zork"® and "The Hitchhiker's Guide to the Galaxy,"™ has a habit of coming up with games that add a new dimension to interactive fiction. And the best keeps getting better. Case in point: "Leather Goddesses of Phobos."™ It has a scratch n' sniff card and a 3-d comic book to excite all your senses. Once your interest is piqued, you'll embark on a rowdy romp through the solar system. This hilarious spoof of 1930's pulp science fiction has 3 "naughtiness levels," for the prude to the lewd. "Leather Goddesses" is sure to amuse members of either sex.

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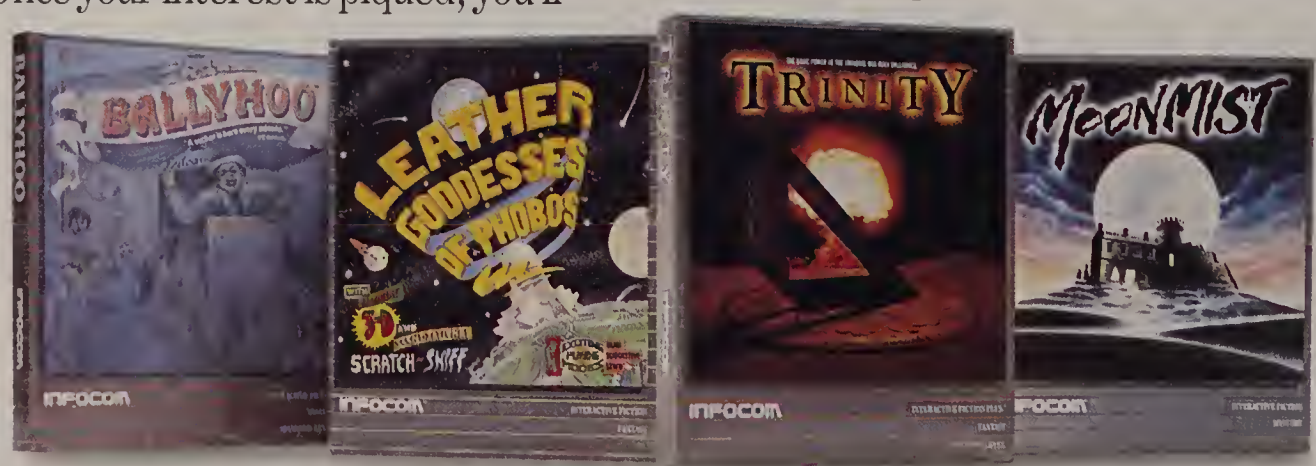


MacWrite Footers and Footnotes

Q. I just finished a 40-page term paper for my high school English class. After typing and correcting it with *MacWrite*, I decided to use the Set Footer command to insert footnotes at the bottom of each page. I set up the footnotes for the first page and noticed that they appeared on all 40 pages. Is there a way to use the Set Footer command independently on each page?

Brian Marantz
Palm Springs, California

A. *MacWrite*'s Set Footer command is just for setting up footers—the standing text at the bottom of each page—not for footnotes. The footer can contain blank lines, text, and even pictures, but as you've discovered, it's all repeated on every page of the document. You can also have *MacWrite* automatically insert the page number and current date or time as part of the footer.

For automatic footnote handling, don't look to *MacWrite*. You'll need another word processor, such as *Microsoft Word*. *Word* lets you type footnotes while you compose the main text and moves and renumbers footnotes if you move the text that refers to them. It does a pretty good job of fitting the footnotes at the bottom of each page, unless you have long footnotes or lots of short footnotes on the page. If you prefer, *Word* places all the footnotes at the end of the document.

Color Disks

Q. I would like to color-key my disk library so that I can find particular disks instantaneously. I have found disks with only royal blue, navy blue, beige, gray, and black plastic covers. Why doesn't somebody come out with disks in colors like green, yellow, or even (gulp) pink or red?

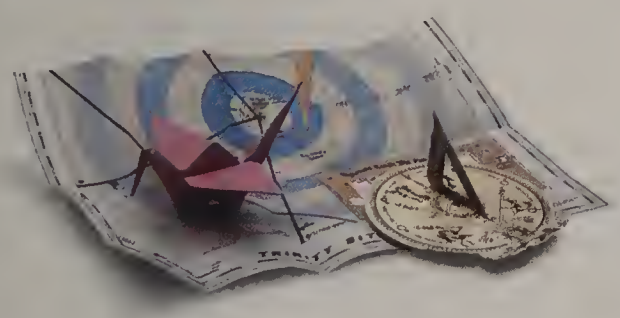
Linda S. Cowls
Forest View, Illinois

A. C. I. Tech International, a wholly owned subsidiary of C. Itoh, makes 3½-inch disks, both single- and double-sided, in ten colors: yellow, light blue, dark blue, pink, vermilion, dark red, green, maroon, orange, and, of course, Apple beige. The disks are distributed nationally; for the name of a nearby dealer or distributor, call 800/423-6870 (in New York State 800/227-7236). At press time, list prices for a box of ten disks were $44.95 for single-sided and $54.95 for double-sided. However, disk prices are volatile, and discounts are common. For example, Mac Accessory Brokers (714/840-0048) was selling double-sided disks for $27 a box in July.

Send questions to Get Info, Macworld, *501 Second St. #600, San Francisco, CA 94107. Send electronic mail to CompuServe 70370,702 or The Source BCW440. All published submissions become the property of* Macworld.

Lon Poole is a Contributing Editor of Macworld. □

es. One really smells.



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SOFTWARE

Affinity Microsystems
Tempo *(power user's macro utility)* . . . . . $59.
Altsys
Fontastic *(create your own fonts)* . . . . . 27.
Ann Arbor
FullPaint *(open four documents at once)* . . 55.
Arrays
Home Accountant *(req. external drive)*. . . . 52.
ATI
Teach Yourself Multiplan . . . . . 39.
Jazz Training . . . . . 39.
Excel Training . . . . . 39.
Batteries Included
The Mac BatteryPak *(8 desk accessories)* 27.
Borland International
Sidekick w/Phonelink. . . . . 59.
BPI Systems
General Accounting *(full-featured)* . . . . . 239.
BrainPower
Think Fast *(improves recall)* . . . . . 23.
Chipwits *(educational, robot simulation)*. . . 26.
StatView *(statistics package)* . . . . . 52.
Designscope *(electronic circuit design)* . . 129.
StatView 512+ *(req. external drive, 512k)* . . 179.
CAMDE
Nutricalc *(diet & nutrition analysis)* . . . . . 49.
Casady Company
Fluent Fonts *(two-disk set)* . . . . . 29.
Fluent Laser Fonts . . . . . *each* 49.
Central Point Software
Copy II Mac *(includes MacTools)* . . . . . 20.
Challenger Software
Mac3D *(3D graphics, CAD features)* . . . . 115.
Chang Labs
Rags to Riches Ledger . . . . . 105.
Rags to Riches Receivables *(req. 512k)*. . 105.
Rags to Riches Payables *(req. 512k)* . . . . 105.
Rags to Riches Three Pak . . . . . 259.
Inventory Control . . . . . 229.
Professional Billing . . . . . 229.
Cortland
TopDesk *(7 new desk accessories)* . . . . . 35.
Creighton Development
MacSpell+ *(spell checker, req. 512k)*. . . . . 55.
Cricket Software
Statworks *(statistical package)*. . . . . 79.
Cricket Graph *(multiple windows)* . . . . . 129.
DataViz
MacLink *(transfer Mac/IBM data)*. . . . . 89.
Desktop Graphics
DrawArt *(MacDraw artwork, req. 512k)* . . . 29.
DrawForms *(requires MacDraw)* . . . . . 30.
MacForms *(requires MacPaint)* . . . . . 42.
Digital, etc.
Turbo Maccountant *(w/video tape)*. . . . . 269.
Dow Jones
Straight Talk *(access News/Retrieval)* . . . . . 59.
Spreadsheet Link . . . . . 62.
Market Manager PLUS . . . . . 125.
Dreams of the Phoenix
Day Keeper Calendar . . . . . 27.
Phoenix 3D *(3D graphics)* . . . . . 27.
Quick & Dirty Utilities Vol. 1 . . . . . 27.
Quick & Dirty Utilities Vol. 2 . . . . . 27.
Twelve-C Financial Desk Accessory. . . . . 27.
Electronic Arts
Financial Cookbook *(financial formulas)*. . . 32.
Deluxe Music Construction Set . . . . . 32.
Enabling Technologies
Easy 3D *(create solid 3D objects)* . . . . . call
Enterset
Quickpaint *(find MacPaint files fast)* . . . . . 27.
Quickset *(icon-driven desk accessories)* . . 27.
Quickword *(word processing tool)* . . . . . 32.
MacGAS *(spell checker, 512k, ext. drive)* . . 55.
1st Byte
Speller Bee *(spelling-learning tool)*. . . . . 39.
KidTalk *(reading-writing instruction)* . . . . . 39.
Smoothtalker *(speech synthesis)* . . . . . 49.
Forethought
Factfinder *(free-form info organizer)* . . . . . 79.
FileMaker *(custom forms & reports)* . . . . . 99.
FileMaker Plus *(updated version)*. . . . . 179.
Fortnum/Southern
MacInooga Choo-Choo *(train set, 512k)* . . 21.
FWB Software
Hard Disk Util *(backup utility)*. . . . . 57.
Great Wave Software
KidsTime *(educational, ages 3-8)*. . . . . 29.
ConcertWare+ *(music composition)* . . . . . 39.
Classical Selections. . . . . 12.
Early Music . . . . . 12.
Hayden Software
I Know It's Here Somewhere *(filer)* . . . . . 20.
Hayden:Speller *(for Word & MacWrite)* . . . . 27.
M.U.D. *(MacroMind Utility Disk)*. . . . . 29.
MusicWorks *(songs for your Mac)* . . . . . 46.
DaVinci Building Blocks *(req. MacPaint)* . . 46.
Home Design *(home planning tool)* . . . . . 49.
Score Improvement System for the SAT . . . 58.
VideoWorks & MusicWorks Bundle . . . . . 58.
DaVinci Commercial Interiors . . . . . 114.
Ideaform
MacLabeler *(print disk labels)* . . . . . 29.
Infosphere
MacServe *(network software)* . . . . . call
Innovative Data Design
Paste-Ease *(requires MacPaint)* . . . . . 35.
MacDraft *(new updated version, 512k)* . . 139.
Kensington
Graphic Accents *(req. MacPaint)* . . . . . 29.
Type Fonts for Text *(16 new fonts)* . . . . . 29.
Type Fonts for Headlines *(req. 512k)* . . . . . 42.
Layered
Notes...For Excel *(tips & templates)* . . . . . 42.
Notes...For Jazz *(on-line help DA)* . . . . . 42.
Front Desk *(scheduling & organizer)* . . . . . 77.
Legisoft/Nolo Press
WillWriter 2.0 *(prepare your own will)* . . . . . 27.
Linguist's Software
Tech *(1000 different symbols)* . . . . . 59.
FOREIGN LANGUAGE FONTS
MacCyrillic . . . . . 39.
SuperFrench/German/Spanish . . . . . 39.
MacArabic . . . . . 59.
MacKana/Basic Kanji . . . . . 59.
MacSemitic/Coptic/Devanagari. . . . . 59.
MacKorean. . . . . 59.
MacGreek. . . . . 59.
MacHebrew . . . . . 59.
MacHieroglyphics. . . . . 59.
LaserGreek. . . . . 79.
MacGreek/Hebrew/Phonetics . . . . . 89.
Living Videotext
ThinkTank 512k *(outline processor)* . . . . . 99.
More *(outlines, windows, & tree charts)* . . 195.
Magnum
McPic - Volume 1 *(req. MacPaint)* . . . . . 28.
McPic - Volume 2 *(req. MacPaint)* . . . . . .$28.
The Slide Show Magician 1.3. . . . . 34.
Manhattan Graphics
Ready Set Go *(page processor, 512k)* . . . . 99.
Microsoft
Flight Simulator *(the Mac takes flight)*. . . . . 32.
Learning Multiplan and Chart *(2 disks)*. . . 39.
Chart 1.0 *(42 chart styles)* . . . . . 72.
Logo 1.0 *(windows, Turtle graphics)*. . . . . 75.
Basic 2.1 *(Basic language interpreter)* . . . . 89.
Multiplan 1.1 *(63 columns by 255 rows)*. . 105.
File 1.02 *(flexible data manager)* . . . . . 111.
Word 1.05 *(word processor, mail merge)* 111.
Fortran 2.1 *(compiler)* . . . . . 169.
Excel 1.0 *(power spreadsheet)* . . . . . 225.
Miles Computing
Mac the Ripper *(2 disks, req. MacPaint)*. . . 27.
Mindscape
The Luscher Profile *(personality profile)* . . . 24.
The Perfect Score: SAT . . . . . 47.
ComicWorks *(create your own comics)* . . . 49.
Monogram
Forecast *(tax planning)* . . . . . 41.
Dollars & Sense *(home, small business)*. . . 81.
Nevins Microsystems
Turbocharger *(disk cache, req. 512k)* . . . . 39.
New Canaan MicroCode
Mac Disk Catalog II *(requires 512k)* . . . . . 32.
Odesta
Helix *(req. 512k, external drive)* . . . . . 125.
Double Helix *(relational, custom menus)* 279.
Palantir
MacType *(supports Dvorak keyboard)*. . . . 26.
MathFlash *(math flash card drills)*. . . . . 26.
WordPlay *(crossword puzzles)*. . . . . 26.
Inventory Control *(cost, sales & GP)*. . . . . 69.
inTouch *(communication to emulation)*. . . . 79.
PBI Software
Icon Switcher *(customized icons)*. . . . . 14.
Icon Fun & Games Library *(req. MacPaint)* 14.
Icon Business Library *(req. MacPaint)* . . . . 14.
HFS Locater *(DA organizer for HFS)* . . . . . 27.
Hard Disk Backup *(supports MFS, HFS)* . . 29.
Peachtree
Back to Basics General Ledger . . . . . 89.
Back to Basics Accounts Payable . . . . . 89.
Back to Basics Accounts Receivable . . . . . 89.
Polarware
Graphics Magician *(animation)* . . . . . 39.
ProVUE Development
OverVUE 2.0 *(power-packed database)* 149.
QED Information Sciences
Typing Made Easy *(instruction)* . . . . . 36.
Rubicon Publishing
Silver Palate Collection *(NY's finest!)* . . . . . 29.
Dinner At Eight *(recipes to wines)* . . . . . 32.
Dinner At Eight-Silver Palate Bundle . . . . . 54.
Satori
BulkMailer *(mailing lists)* . . . . . 75.
Sierra On-Line
MacOneWrite *(cash disbursements)* . . . . 137.
MacOneWrite *(accounts receivable)* . . . . 137.
MacOneWrite *(general ledger)*. . . . . 137.
Silicon Beach Software
Accessory Pak 1 *(useful utilities)* . . . . . 21.
Silicon Press *(printer utility, 512k)*. . . . . 42.
Simon & Schuster
The Mac Art Department *(req. MacPaint)*. . 24.
Paper Airplane Construction Kit. . . . . 24.
Typing Tutor III *(learn to type!)* . . . . . 35.

We'd like to think you're even stranger.

A walk on the weird side.
Back in prehistoric Mac times (early 1985) we held a contest to unearth strange-but-true Mac stories. Winners received $500 worth of Mac add-ons and software, and became stars of a series of MacConnection advertisements.

The response was overwhelming. Our customers were using their Macs to run detective agencies, back up heavy metal bands, even to help explore the frozen tundra for remains of old expeditions.

The odd get even.
Well, it's time to find out what new heights of eccentricity you've achieved. Has your Mac saved your life during a terrorist attack? Have you used a Mac to predict how many times per episode of Miami Vice Don Johnson will say the word "pal"? Have you used a Mac to create a mutant life form that will save the planet from radioactive fallout?

We're looking for adventure, romance, mystery, the occult. Mac applications that are so fascinating, far-fetched, or far-out that your fellow Mac fanatics will froth at the follicles, and feel all fuzzy around their foreheads. Oh yes. We're talking serious strangeness here. Send along any relevant snapshots, drawings, and/or newspaper clippings with your entry. Don't forget to enclose your name, address and phone number. And keep a copy for yourself—everything you send us becomes the property of MacConnection.

What do I win?
$500 worth of free add-ons and software and instant fame! All entries must be received by December 31, 1986. The totally subjective decision of our judges is final. Good luck! And remember, whether you win or not, we at MacConnection are always here to fulfill your wildest Mac dreams.

MacConnection™

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Facts, Mac. Stran

SoftStyle
Colormate Art *(Colormate images)* . . . . . $25.
Colormate *(color printing utility)* . . . . . 49.
Epstart *(Epson printer driver)* . . . . . 27.
Jetstart *(Hewlett-Packard Thinkjet)* . . . . . 27.
Laserstart *(Hewlett-Packard Laserjet)* . . . . 59.
Decision Map *(make better decisions!)* . . . 75.
Software Discoveries
Record Holder *(flexible data manager)* . . . 42.
Springboard
Art a la Mac Vol. 1-People and Places . . . . 23.
Art a la Mac Vol. 2-Variety Pack . . . . . 23.
Easy as ABC *(ages 3-6, letters)* . . . . . 29.
Early Games *(ages 2-6, shapes, counting)* 29.
State of the Art
Electric Checkbook *(prints checks)* . . . . . 39.
Symmetry
Acta *(outline/writing desk accessory)* . . . . . 39.
PictureBase *(clip art manager, 512k)* . . . . . 45.
T/Maker
ClickArt Personal Graphics *(req. MacPaint)* 29.
ClickArt Publications *(req. MacPaint)* . . . . . 29.
ClickArt Letters *(req. MacPaint)* . . . . . 29.
ClickArt Effects *(req. MacPaint)* . . . . . 29.
ClickOn Worksheet *(spreadsheet DA)* . . . . 46.
Target Software
MacLightning *(interactive spell checker)* . . 53.
Telos Software
Filevision *(graphic filing program)* . . . . . 99.
Business Filevision *(512k, external drive)* 199.
Think Educational
MacEdge II *(math & reading)* . . . . . 28.
Mind Over Mac . . . . . 29.
TML Systems
TML Source Code Library . . . . . 59.
TML Pascal *(compiler, req. 512k)* . . . . . 69.
TrueBasic
True BASIC *(fast, flexible & portable)* . . . . . 89.
Algebra Utility . . . . . 36.
Calculus Utility . . . . . 36.
3D Graphics Utility . . . . . 36.
Videx
MacCalendar *(includes reminder system)* 52.

GAMES

Activision
Championship Star League Baseball . . . . . 22.
Hacker *(you're on your own!)* . . . . . 27.
Mind Shadow *(Who am I?)* . . . . . 27.
Borrowed Time *(murder mystery)* . . . . . 27.
Shanghai *(Mah Jongg strategy)* . . . . . 27.
Alter Ego *(male or female version)* . . . . . 36.
Ann Arbor Softworks
Grid Wars *(3D graphic arcade)* . . . . . 22.
Artworx
Bridge 4.0 *(sharpen your skills)* . . . . . 21.

MacConnection Special of the Month
through October 31, 1986

MIRROR TECHNOLOGIES
MagNet 20X External Hard Drive
This reliable multiuser 20 Meg unit offers both speed and portability for your Mac Plus. MacServe (a $250 value) is bundled free with the MagNet 20X, allowing other Macs to share data and peripherals.

- Plugs into SCSI port
- Password protection for files
- Print spooling & file backup
- FastPort option provides SCSI interface for 512k owners

MagNet 20X . . . . . $925.
MagNet 20X/FastPort Bundle . . . . . 1049.

Bantam Electronics
Sherlock Holmes: Another Bow . . . . . 27.
Blue Chip
Millionaire *(stock market)* . . . . . 35.
Tycoon *(commodities)* . . . . . 35.
Baron *(real estate)* . . . . . 35.
Squire *(personal finance, req. 512k)* . . . . . 35.
Broderbund Software
Lode Runner *(over 150 levels)* . . . . . 24.
Ancient Art of War *(military strategy)* . . . . . 27.
CBS
Murder by the Dozen *(twelve mysteries)* . . 25.
Electronic Arts
Skyfox *(3D graphics)* . . . . . 27.
One on One/Dr J vs Larry Bird *(req. 512k)* 27.
Pinball Construction Set . . . . . 27.
Epyx
Rogue *(strategy dungeon classic!)* . . . . . 24.
Temple of Apshai Trilogy *(4 levels)* . . . . . 24.
Winter Games *(Olympic events)* . . . . . 24.
Hayden Software
Sargon III *(9 levels of chess)* . . . . . 29.
Infinity Software
Grand Slam *(tennis, req. 512k)* . . . . . 28.
Infocom
Seastalker *(junior)* . . . . . 23.
Ballyhoo, Cutthroat, Hitchhiker's Guide, Planetfall, Wishbringer, Enchanter, Zork I, The Witness *(standard)* . . . . . each 23.
Zork II, Zork III, Sorcerer, Infidel, Suspect, Mind Forever Voyaging *(advanced)* each 26.
Deadline, Spellbreaker, Suspended, Starcross *(expert)* . . . . . each 29.
Invisiclues *(hint booklets)* . . . . . each 6.

Miles Computing
Fusillade *(arcade-maze)* . . . . . $21.
MacAttack *(3D tank simulation)* . . . . . 27.
Harrier Strike Mission *(3D flight simulation)* 27.
MacWars *(3D space simulation)* . . . . . 27.
Mindscape
Rambo: First Blood Part II . . . . . 24.
James Bond 007: "A View to a Kill" . . . . . 24.
Stephen King's "The Mist" . . . . . 24.
Racter *(converse with your Mac!)* . . . . . 27.
Balance of Power *(world politics)* . . . . . 30.
Brataccus *(great graphics, req. 512k)* . . . . 30.
Uninvited *(mystery adventure)* . . . . . 30.
Deja Vu *(murder mystery)* . . . . . 33.
Origin Systems
Exodus: Ultima III *(fantasy adventure)* . . . . 38.
PBI Software
Strategic Conquest *(war strategy)* . . . . . 29.
Fokker TriPlane Flight Simulator . . . . . 35.
Polarware
Transylvania *(rescue Princess Sabrina)* . . . 15.
Crimson Crown *(sequel to above)* . . . . . 15.
Sword of Kadash *(fantasy adventure)* . . . . 15.
The Quest *(beware of the dragon!)* . . . . . 15.
Xyphus *(role playing adventure)* . . . . . 15.
Practical Computer Applications
MacGolf *(Tee off! Requires 512k.)* . . . . . 36.
Psion
Psion Chess *(3D and multi-lingual)* . . . . . 31.
Sierra On-Line
Frogger *(classic video game)* . . . . . 24.
Championship Boxing *(knock 'em out!)* . . . 24.
Ultima II *(role playing adventure)* . . . . . 35.
Silicon Beach Software
Airborne! *(digitized-sound war game)* . . . . 20.
Enchanted Scepters *(sound & graphics)* . . 21.
Simon & Schuster
Star Trek—The Kobayashi Adventure . . . . 24.
Sir-Tech
Mac Wizardry *(high-rated adventure)* . . . . . 36.
Spectrum Holobyte
GATO *(submarine simulation)* . . . . . 26.
Orbiter *(requires 512k)* . . . . . 27.
Tellstar North Level I *(req. 512k)* . . . . . 27.
Unicorn
Futuria *(sci-fi adventure)* . . . . . 24.
Animal Kingdom *(ages 6-12)* . . . . . 27.
Decimal Dungeon *(math, ages 9 and up)* 27.
Fraction Action *(arcade style math game)* 27.
Mac Robots *(pre-school program)* . . . . . 27.
Read-A-Rama *(reading, ages 5-8)* . . . . . 32.
Videx
FunPak *(Solitaire and more)* . . . . . 23.
MacCheckers/Reversi . . . . . 28.
MacGammon/Cribbage . . . . . 28.
MacVegas *(7 casino games)* . . . . . 34.

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Circle 4 on reader service card

ge but true.

HARDWARE

Assimilation
MIDI Conductor . . . . . $69.
Mac•Port•Adaptor . . . . . 75.
Numeric•Turbo . . . . . 129.
Compucable
Mac to Hayes Smartmodem cable. . . . . 16.
Mac to Imagewriter cable . . . . . 16.
Mac Plus to Hayes Smartmodem cable . . . 19.
Mac Plus to Imagewriter II cable . . . . . 21.
Cuesta Systems
Datasaver AC Power Backup *(90 watts)* . . call
Curtis Manufacturing
Diamond *(6 outlets)* . . . . . 29.
Emerald *(6 outlets; 6 ft cord)* . . . . . 36.
Sapphire *(3 outlets; EMI/RFI filtered)* . . . . . 47.
Ruby *(6 outlets; EMI/RFI filtered; 6 ft cord)* 55.
Epson
FX-85 printer . . . . . call
FX-286 printer . . . . . call
LQ-1000 printer *(letter quality)* . . . . . call
Ergotron
MacTilt *(includes external drive bracket)* . . 75.
MacBuffer 256k. . . . . 259.
MacBuffer 512k. . . . . 389.
MacBuffer 1 Megabyte . . . . . 569.
Hayes
Smartcom II *(communications software)* . . 89.
Smartmodem 1200 . . . . . call
Smartmodem 2400 . . . . . call
Smartmodem Package *(includes modem, Smartcom II and cable)* . . . . . call
Transet 1000 . . . . . call
IOMEGA
Bernoulli Box *(dual 10-MB w/SCSI)* . . . . 1995.
Bernoulli Box *(dual 10-MB storage)* . . . . 2195.
10 Meg cartridge. . . . . 51.
Kensington
External Disk Drive Cover . . . . . 8.
Mouseway *(mouse tracking pad)*. . . . . 8.
Mouse Pocket *(for your idle mouse)*. . . . . 8.
Mac (Plus) Dust Cover. . . . . 9.
Imagewriter (II) Dust Cover . . . . . 9.
Mouse Cleaning Kit w/Mouse Pocket. . . . . 16.
Universal Printer Stand . . . . . 17.
Disk Case *(holds 36 Mac disks)* . . . . . 19.
Disk Drive Cleaning Kit . . . . . 19.
Tilt/Swivel . . . . . 22.
Polarizing Filter . . . . . 31.
Surge Suppressor . . . . . 35.
Starter Pack *(includes Tilt/Swivel)*. . . . . 53.
A-B Box *(specify Mac or Mac Plus)*. . . . . 62.
Control Center. . . . . 62.
System Saver Mac *(complete with fan)* . . . 65.
Koala Technologies
KAT Graphics Tablet . . . . . 139.
MacVision *(digitizer)* . . . . . 175.
Kraft
QuickStick *(Mac joystick)*. . . . . 45.
Micah
MicahDrive AT *(20 Meg internal drive)* . . 1195.
Mirror Technologies
FastPort *("SCSI" for your 512k Mac)* . . special
MagNet 20x External Drive w/cable. . . special
N² Products
Mac Modem cable *(6 feet)*. . . . . 19.
Mac Transet 1000 cable *(9 feet)*. . . . . 19.
Mac (Plus)-Printer cable *(6 feet)*. . . . . 19.
Mac Plus Adapter cable . . . . . 19.
Mac Plus-SCSI cable. . . . . 24.
Paradise Systems
Mac 10 *(10 megabyte hard disk)*. . . . . call
Mac 20 *(20 megabyte hard disk)*. . . . . call
PBI Software
Switch Box *(connect two peripherals)* . . . . 36.
Personal Computer Peripherals
MacBottom 20 Hard Disk Drive . . . . . 949.
PKI
McD 800k External Drive. . . . . 239.
Summagraphics
MacTablet 6″ x 9″ *(stylus driven)* . . . . . 265.
MacTablet 12″ x 12″ *(sketching)*. . . . . 369.
Systems Control
MacGard *(surge protection)* . . . . . 55.
Thunderware
Thunderscan *(high-resolution digitizer)* . . 175.
Mac Plus Power Accessory . . . . . 29.
Thunderscan/PA Bundle w/cables . . . . . 229.
Western Automation
DASCH RAMdisk 500k . . . . . 299.
DASCH RAMdisk 1000k . . . . . 359.
DASCH RAMdisk 2000k . . . . . 435.

DISKS

Single-sided Diskettes

BASF 3½″ Disks *(box of 5)* . . . . . 9.
Memorex 3½″ Disks *(box of 10)* . . . . . 15.
Sony 3½″ Disks *(box of 10)* . . . . . 17.
Verbatim 3½″ Disks *(box of 10)* . . . . . 17.
MAXELL 3½″ Disks *(box of 10)*. . . . . 17.
Fuji 3½″ Disks *(box of 10)*. . . . . 17.
3M 3½″ Disks *(box of 10)* . . . . . 19.

Double-sided Diskettes

BASF 3½″ Disks *(box of 5)* . . . . . 14.
Fuji 3½″ Double-sided Disks *(10)* . . . . . 26.
Sony 3½″ Double-sided Disks *(10)*. . . . . 26.
Verbatim 3½″ Double-sided Disks *(10)*. . . 26.
MAXELL 3½″ Double-sided Disks *(10)* . . . 26.
3M 3½″ Double-sided Disks *(10)*. . . . . 27.

INFORMATION SERVICES

Compuserve
Compuserve Information Service . . . . . 27.
Dow Jones
Dow Jones News/Retrieval Membership Kit 21.
Source Telecomputing
The Source *(subscription & manual)* . . . . . 30.

ACCESSORIES

Automation Facilities
Floppiclene Drive Care Kit. . . . . 15.
MacPak Complete Care System . . . . . 29.
Clean Image Ribbon Co.
Clean Image Kit *(cleans printhead)* . . . . . 12.
Computer Coverup
External Disk Drive Cover . . . . . 4.
Imagewriter (II) Cover . . . . . 8.
Mac (Plus) & Keyboard *(two covers)* . . . . . 10.
Diversions
Underware Ribbon *(iron-on black transfer)* 9.
Colorpens *(add color to transfers)* . . . . . 10.
ColorPack *(includes Colorpens)* . . . . . 19.
Environmental Software Company
The Clutch *(holds 8 disks)* . . . . . 9.
MACATTIRE (Rip-stop nylon covers)
External Drive Cover *(400k or 800k)* 7
Numeric Keypad Cover. . . . . $7.
Numeric Turbo Cover . . . . . 8.
Imagewriter (II) Cover . . . . . 11.
Wide Imagewriter Cover . . . . . 13.
Mac (Plus) & Keyboard Cover . . . . . 15.
Laserwriter Cover . . . . . 17.
Mac (Plus) & HD20 & Keyboard Cover . . . 18.
I/O Design
Imageware *(Imagewriter, or VCR case)* . . . 39.
Imageware II *(Imagewriter II case)*. . . . . 49.
Imageware wide *(for 132 col. Imagewriter)* 49.
Macinware Plus *(Mac Plus carrying case)* 69.
Innovative Concepts
Flip & File Micro *(holds 25 disks)* . . . . . 9.
Flip & File *(holds 40 disks)* . . . . . 18.
Innovative Technologies
The Pocket Pak *(holds 6 disks)* . . . . . 9.
The Easel *(holds 20 disks)*. . . . . 12.
The Disk Directory *(holds 32 disks)* . . . . . 18.
Kalmar Designs
Teakwood Roll-top Case *(holds 45 disks)* . . 14.
Teakwood Roll-top Case *(holds 90 disks)* . . 21.
Teakwood Printer Stand 24″ . . . . . 29.
Magnum
Mouse Mover *(let your mouse ride!)*. . . . . 14.
Moustrak
Moustrak Pad *(standard 7″ x 9″)* . . . . . 8.
Moustrak Pad *(large 9″ x 11″)* . . . . . 9.
Ribbons Unlimited
Imagewriter Color Ribbons . . . . . 5.
Imagewriter Ribbons Six Pack. . . . . 25.
Imagewriter Rainbow Six Pack . . . . . 25.
Smith & Bellows
Mahogany Disk Case *(holds 90 disks)* . . . . 28.

OUR POLICY

- We accept VISA and MASTERCARD. (Only on U.S. & Canadian orders.)
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- Your card is not charged until we ship.
- If we must ship a partial order, we never charge freight on the shipment(s) that complete the order.
- No sales tax.
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- Allow 1 week for personal and company checks to clear.
- UPS Next-Day-Air available.
- COD max. $1000. Cash or certified check.
- 120 day limited guarantee on all products.*
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The Power behind the Plotter

Prasad Kaipa and Edwin Haskell

The Macintosh in combination with CAD or graphics software and a pen plotter add up to a powerful graphics team that's used by architects, engineers, business people, and artists to produce high-quality, large-format color drawings. That lineup however—drawing program, computer, and plotter—omits one critical player: the plotter driver. In many ways the performance and capabilities of a plotter are determined not by the output device itself, but by this little-understood piece of software.

Although one can create superb graphics on the Macintosh and print them on the LaserWriter, when large, color, high-resolution (up to .001 inch) drawings are needed, a digital plotter is the device of choice. Plotters have long been the mainstay output device of computer-aided design, and they are increasingly being used for a wide range of applications, from producing semiconductor designs to creating graphics for business presentations.

But plotters can't do anything without a plotter driver, the program that translates the computer's or application program's commands into the command language stored in the ROM of the plotter.

Plotter drivers for the Macintosh fall into three categories: professional, general-purpose, and integrated. The professional drivers work with high-end plotters and provide a precise degree of accuracy and control. General-purpose drivers offer a simpler user interface and lower price tag than the professional

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7

models. These low-end programs fill the requirements of departments, offices, or individuals that occasionally need to produce presentation graphics, announcements, or advertisements in large sizes and striking colors.

Integrated drivers are so named because they are built into applications programs, such as *Cricket Graph, EZ Draft,* and *Color Chart.* For this review we looked at only the four independently marketed drivers currently available for the Macintosh: *Plotstart* and *Plot-It* are both general-purpose drivers. *MacPlot* and *MacPlots II* come in basic and professional versions; for this review we concentrated on these programs' full-featured implementations.

Driver Differences

The table "Plotter Drivers Compared" summarizes the characteristics of the drivers under review. These drivers vary a great deal, both in terms of features and basic design. Understanding a few things about how they work will help you pick the driver that suits your needs and work style.

Most of the drivers under review, for example, are not drivers in the sense of an ImageWriter or a LaserWriter driver, which you install in the System Folder and then use from within any application program. With the exception of *Plotstart,* which works as a desk accessory, these drivers are actually application programs into which you must import your drawings for manipulation and plotting. *MacPlots II* is the only currently available program that can open files from other programs directly; *MacPlot* and *Plot-It* force you to import files through the Clipboard.

Another facet of these programs is that they don't necessarily reproduce what is on the Mac screen. For example, none of the programs can plot all of the Mac's fill patterns. A plotter will either ask you to make substitutions or make them for you. Similarly, neither *MacPlots II* nor *Plotstart* uses the Mac's fonts; instead, they rely on the character sets contained within the plotters themselves. In addition, these two programs cannot access any special characters that reside within the plotter fonts—a significant problem if, for example, you regularly use Greek letters or equation symbols.

Plotter Drivers Compared

	MacPlot*	MacPlots II*	Plotstart	Plot-It
Paint files	no	yes	no	yes
Object fields	yes	yes	yes	no
Bit maps	yes	yes	no	yes
PICT files	no	yes	yes	no
Uses Clipboard	yes	yes	yes	yes
Works as a desk accessory	no	no	yes	no
Supports plotter fonts	yes	yes	yes	no
Supports Mac fonts	yes	no	no	yes
Font styles and sizes	no/yes	yes/yes	italic only/ yes	yes
Calculates hidden objects	yes	yes	no	n/a
Plots arcs	yes	yes	no	yes
Performs smoothing	yes	yes	no	n/a
Color specification	in MacPlot	in MacDraw	in Plotstart	in Plot-It
Recognizes line widths	no	yes	no	yes
Scaling	yes	yes	limited	yes
Partial plot	indirect	indirect	indirect	yes
Multiple copies	no	yes	yes	no
Pause feature	yes	no	no	no
Precision plotting	yes	yes	no	no
Copy protected	yes	yes	no	yes
HD install	no	no	yes	no
Switcher compatible	yes	yes	n/a	yes
Backup	$15	yes	n/a	yes

*Professional version

Plot-It

Plot-It is a fast, fun color-plotting application that plots *MacPaint* documents only. It features a speed control that's useful for producing transparencies, and it allows easy, though imprecise, adjustment of plot size and orientation. To plot solid areas of a drawing or heavy lines, *Plot-It* replaces *MacPaint*'s dot patterns with patterns of solid lines resembling a maze. When graphics are plotted at normal sizes, the effect is natural; enlargements, however, take on a surrealistic quality, and solid filling of highly enlarged images is not possible.

Unique among the plotters reviewed, *Plot-It* lets you scale or color portions of a drawing that you mark with a selection rectangle. This coloring scheme has its down side, however. To create a multicolor drawing, you must select an area, specify a color, and then plot that color before moving on to the next color. Furthermore, the program displays an entire full-page *MacPaint* document on less than half a screen, making precise selection of coloring areas impossible. These limitations make *Plot-It* useful only for coloring bar charts or other drawings in which colored areas are easy to select. The addition of a lasso-like selector with FatBits precision would be a definite improvement.

Plot-It uses bit maps of the Mac's fonts to produce lettering similar to the Standard print from an ImageWriter. *Plot-It* is copy protected and requires that you insert the master disk whenever the program is accessed. This is true even if the master disk is in the drive when the program is called up from a hard disk.

According to Mesa Graphics, version 2 of *Plot-It* (which may be available by the time this magazine hits the stands) will access PICT files, remove hidden objects, and support larger plotters. The upgrade will be available to current owners for about $30.

Plotstart

Plotstart is an inexpensive general-purpose plotter driver that's easy to use and works as a desk accessory. The program is not compatible with bit-mapped files but does work with files from programs such as *Microsoft Chart, Cricket Graph, Excel, Draw,* and *Microsoft Word.*

To denote different colors, *Plotstart* uses specific fill patterns, which you can assign with a special accessory program. *Plotstart* plots on pages up to 11 by 17 inches and offers a choice of horizontal or vertical page alignment. The program has a slow-speed option for making transparencies but produces only 50 percent reductions. Unlike the other drivers, *Plotstart* lets you plot text in color.

When tested with a *MacDraw* file, *Plotstart* failed to plot arcs correctly (it drew a line connecting the two ends of the arc) and couldn't interpret *MacDraw*'s smoothing command. A more serious problem is *Plotstart*'s inability to calculate hidden objects; when *MacDraw* objects overlap—for example, when a patterned oval covers the corner of a patterned square—*Plotstart* simply draws one object on top of the other. Another serious drawback is *Plotstart*'s inability to distinguish line weights in an object file. No matter how thick a line is in a drawing, *Plotstart* simply plots it at a standard, thin weight.

Plotstart is not copy protected, and a toll-free number is provided for support. According to the manufacturer, a future version with hidden-area removal is planned.

MacPlot

MacPlot is a full-featured plotting program available in standard and professional versions. The latter is distinguished solely by its ability to support D- and E-size plotters (22 by 34 inches and 34 by 44 inches, respectively). The program accesses both bit-mapped and object-oriented files through the Clipboard.

MacPlot does not reproduce standard Macintosh line or fill patterns. Instead, program menus display the original patterns alongside a selection of simplified patterns and ask you to assign substitutions. *MacPlot* patterns are limited to dashed, hatched, or cross-hatched lines; however, the program lets you specify the angle and spacing of the pattern elements. The pattern menu also enables you to assign colors to specific line types and fill patterns. Like *Plotstart, MacPlot* cannot recognize lines of varying thickness—a serious omission in a program designed for professionals.

MacPlot is the only driver tested that can use either internal plotter fonts or Mac fonts. All text within a file, however, must be plotted using one method or the other. In addition, we tested the program with Software for Recognition Technologies' *MacEquation* desk accessory, and several of the symbols failed to print. If you regularly use special fonts or characters, be sure to try them with *MacPlot* before you buy the driver.

In case the number of pens needed for a plot is greater than the number of pens available on the plotter, a *MacPlot* option enables the program to prompt for up to 30 additional pens. *MacPlot* handles reductions and enlargements with precision, providing a choice of ratios in discrete steps from 12:1 to 1:32. Page positioning, however, is less precise; you must position an image of a drawing on the Mac screen manually, without benefit of a ruler.

HI DMP-51MP
This high-end plotter from Houston Instrument is suitable for the professional demands of engineers and architects. The HI DMP-51MP accepts C (17 by 22 inches) and D (22 by 34 inches) engineering paper sizes and has a list price of $6495.

Using the minimal System file supplied with *MacPlot,* the maximum document size *MacPlot* can manage is about 90K on a 512K Macintosh. The program's limit may prove to be less than this, however, if your drawings include many hidden objects or if you use a larger System file. The current version of *MacPlot* is copy protected and requires that you insert the master disk into the internal drive whenever the program is accessed.

According to the manufacturer, a future version of *MacPlot* (which may be available by the time you read this) will be implemented as a true plotter driver, allowing access to drawings from within other applications, and will provide a choice of plotting resolutions (screen or plotter). The new version will also recognize different line thicknesses, plot files from programs with color capability (for example, *Cricket Graph* or *EZ Draft*) in color, and incorporate a less cumbersome copy-protection scheme.

MacPlots II

MacPlots II is another powerful plotter driver suitable for professional graphics work. It opens PICT or *MacPaint* files directly from other applications or imports graphics through the Clipboard. This program more nearly attains the what-you-see-is-what-you-get standard than any of the other programs we tested.

A Plotter's Primer

Hewlett-Packard and Houston Instrument manufacture over three-fourths of the plotters sold in the continental United States, with machines ranging from low-end business graphics models that accept only 8½- by 11-inch paper to full-featured professional models that accept plotting media of up to 36 by 48 inches. Several other companies manufacture either special-purpose plotters or a limited range of plotters.

The two major types of plotters, flatbed and drum, are named for their paper and pen movement techniques. Flatbed plotters hold the paper on a stationary, flat plate, while the pen head—attached to a drawing arm—moves over this surface to create an image. Drum plotters move the paper on one axis while the pen moves on the other. The traditional drum plotter employs a drum for

Plotter Support
This table lists the pen plotters that each plotter driver supports. The two low-end drivers support only low-end plotters, while the professional drivers work with a wider range of machines.

Plotter Support

	MacPlot*	MacPlots II*	Plotstart	Plot-It
Alphaplot I	yes			
Alphaplot II	yes			
Apple Plotter	yes			yes
Calcomp 104	yes			
Calcomp 107	yes			
Calcomp 9x5	yes			
Calcomp 81	yes			
Epson HI-80	yes			
Gould 6310	yes	yes		
Gould 6320	yes	yes		
Graphtec FP5301	yes			
Graphtec GP9101	yes			
Graphtec MP1000	yes			
Graphtec MP1000 USA	yes			
Graphtec MP2000	yes			
HP ColorPro			yes	
HP 7220	yes			
HP 7221	yes			
HP 7440	yes			
HP 7470	yes	yes		yes
HP 7475	yes	yes	yes	yes
HP 7550	yes	yes	yes	
HP 7580	yes	yes		
HP 7585	yes	yes		
HP 7586	yes	yes		
Hitachi 672	yes			
HI DMP29		yes		yes
HI DMP40	yes	yes		
HI DMP41		yes		
HI DMP42	yes	yes		
HI DMP52	yes	yes		
HI DMP51MP		yes		
HI DMP52MP	yes	yes		
HI E595 DN	yes			
HI PC 595	yes			
HI PC 695				yes
HI DMP56	yes			
Penman 6.1	yes			
Roland DXY-880	yes	yes		
Sekonic SPL410	yes			
Sweet 'P' SP601	yes	yes		

**Professional version*

holding and moving the paper, but a variation, the roller-bed plotter, uses small rollers to position and move the paper over a flat plane. Both drum and flatbed plotters can choose automatically from a selection of pens of different colors, types, or line weights.

Inexpensive plotters like the HP ColorPro, the HI PC 595, and the HI PC 695 are ideal for plotting business graphics. They draw on 8½- by 11-inch or 11- by 17-inch paper and work with a large number of personal computers. Even these low-end plotters support a limited number of fonts and offer font scaling and a choice of styles; however, resolution and accuracy are not necessarily at a level required by architects or engineers. As with the more expensive models, accessories allow these low-end plotters to plot directly on transparencies and other media. Prices for low-end plotters range from $500 to $1200.

The HP series 7470, 7475, and 7550 and the HI DMP29 are used for scientific and statistical analyses in addition to business graphics. Prices range from $2000 to $3500, and the output resolution is about .003 inch.

High-end plotters, which include the HP 7580 series and the HI DMP50 series, cater to the needs of designers, architects, and special-application engineers. Costing from $5000 to $18,000, these plotters can plot with a step size of .001 inch. They incorporate digitizing tablets, data buffers, and multiple interfaces and produce a variety of American and European fonts in different sizes and styles.

To test the drivers in this article, we used the HI DMP29 and DMP52MP and the HP ColorPro 7475A and 7585B plotters, some of the most popular ones used with the Macintosh.

The professional version of *MacPlots II* features hidden object removal; an option for adjusting the plotter's drawing pattern to match the width of a particular pen; a Quick Plot utility for very rapid output; more precise control over page positioning; and support of C- (17 by 22 inches), D-, and E-size plotters.

MacPlots II cannot directly color files from most applications. You must first transfer a file to *MacDraw,* which provides a special procedure for ascribing color attributes to any object. *MacPlots II* recognizes *MacDraw*'s color attributes and specifies pen colors accordingly. *MacPlots II* also recognizes all line thicknesses from *MacDraw* and *MacDraft* and plots them automatically.

MacPlots II reproduces the *Excel, Jazz,* and *MacDraw* patterns that commonly appear in technical drawings. The program scales in 1 percent increments from 1:4 to 2:1—a rather limited range considering the ability of the professional version to plot on size E paper. *MacPlots II* loads drawings considerably faster than the other drivers do, and the program optimizes the orientation of a drawing and the plotter's pen changes for maximum speed. (This speed optimization does not apply with *MacPaint* files.)

MacPlots II sometimes distorts images; this problem is particularly noticeable with text created in *MacProject* and occurs sometimes with *MacPaint* and *Cricket Graph* files. The reasons for this distortion involve the use of bounding rectangles, which are produced in the applications and are also used by *MacPlots II. MacPlots II*'s copy-protection scheme requires insertion of the master disk whenever the program is accessed.

Conclusions

All these programs have both strengths and weaknesses. While *Plot-It* works with a very limited number of plotters and sometimes produces odd pattern effects, it provides an easy and effective way to color *MacPaint* files for presentations. According to Mesa Graphics, a completely revised version of *Plot-It* is planned; the new version will plot more than just *MacPaint* files and will remove hidden objects. If, as Mesa claims, the new release is priced similarly to the current version, this program will be a very good value indeed.

Plotstart is a good general-purpose driver for a business person who needs quick transparencies or color graphics. However, in its next release we'd like to see its line width, smoothing, arc, and hidden-area problems resolved. The program is limited in that it works only with Hewlett-Packard plotters.

The *MacPlot* and *MacPlots II* versions that we looked at are both precise, full-featured programs suitable for professional applications. While *MacPlots II* has a lot going for it, it is not without faults. Transferring files to *MacDraw* for coloring and then back to

MacPlots II for plotting is time-consuming. In addition, *MacDraw* requires that you specify colors object by object. The program's strong points are fast file loading and plotting, its ability to open files directly, and its ability to produce Mac patterns.

MacPlot works with a wider variety of plotters than *MacPlots II,* and its ability to output Mac fonts is useful. On the other hand, *MacPlot*'s inability to recognize line widths could disqualify it for some jobs. The manufacturers of both *MacPlot* and *MacPlots II* were planning upgrades when this article went to press, so before you let our specific criticisms sway you, ask your dealer if they are still valid.

HP ColorPro
This inexpensive flatbed plotter from Hewlett-Packard produces appealing color presentation graphics. The ColorPro accepts A (8½ by 11 inches) and ISO A4 (210 by 296 millimeters) paper sizes and costs $1295.

High-quality, full-featured plotter drivers further legitimize the Macintosh in an area in which it has already excelled—graphic design. On the down side, since what you see is not yet what you get, the current crop of drivers still requires that you design your graphics with a specific program in mind. Because of this, the Mac purist in us remains unsatisfied, waiting for a program that adheres to the spirit of the Mac standard.

We're sure a spoiled bunch. □

Prasad Kaipa and Edwin Haskell are assistant professors at the University of Utah, where they research the effects of radiation fallout in southern Utah and Japan. Dr. Kaipa is also the president of MacWiz Consulting.

Editor's Note
Just before this article went to the printer, Macworld *received updated versions of both* Plot-It *and* MacPlots II. *We have not tested these upgrades but thought we should share the available information about these programs' new capabilities.*

Plot-It *version 2.0 represents a major upgrade. The biggest news is that it reportedly works with object-oriented and PICT files in addition to* MacPaint *files. The new program supports all HP and HI plotters, including the high-end HP 7586B and HI DMP56.* Plot-It *now performs hidden-object removal and offers precise control of plotter scaling.* Plot-It *now uses Macintosh fonts, and it lets you resize plotter fonts. The program provides three pen speeds, enabling you to plot on vellum, paper, or mylar with accuracy. A unique tiling feature allows division of large graphics into multiple plots. If everything works as claimed, this upgrade is an exceptional value at $125 ($30 for registered version 1.0 owners).*

MacPlots II *version 2.1 lets you view the complete graphic to be plotted, not just a portion of it—eliminating some problems involving bounding rectangles. In addition, the program provides better support for bit maps and lets you produce bit-mapped superscripts, subscripts, and Greek characters.*

Plot-It, version 1.0
Mesa Graphics
P.O. Box 600
Los Alamos, NM 87544
505/672-1998
List price: version 2.0 $125

Plotstart, version 2.5
Softstyle, Inc.
7192 Kalanianaole Hwy. #205
Honolulu, HI 96825
800/367-5600, 808/396-6368
List price: $125 including cable

MacPlot, version 2.2
CompServCo
800 Freedom Ln.
Slidell, LA 70458
504/649-0484
List price: standard $162, professional $325

MacPlots II, version 2.0
Computer Shoppe
P.O. Box 18344
Greensboro, NC 27419
919/299-4843
List price: Business $195, Drafting $295

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A Network Divided

Jim Heid

Networks are all about sharing, and a distributed network takes the concept to its limits. Instead of using a single hard disk drive to store all the network applications and documents, a distributed network makes the storage devices on one or more computers available to the other network users. If your office has several Macs with hard

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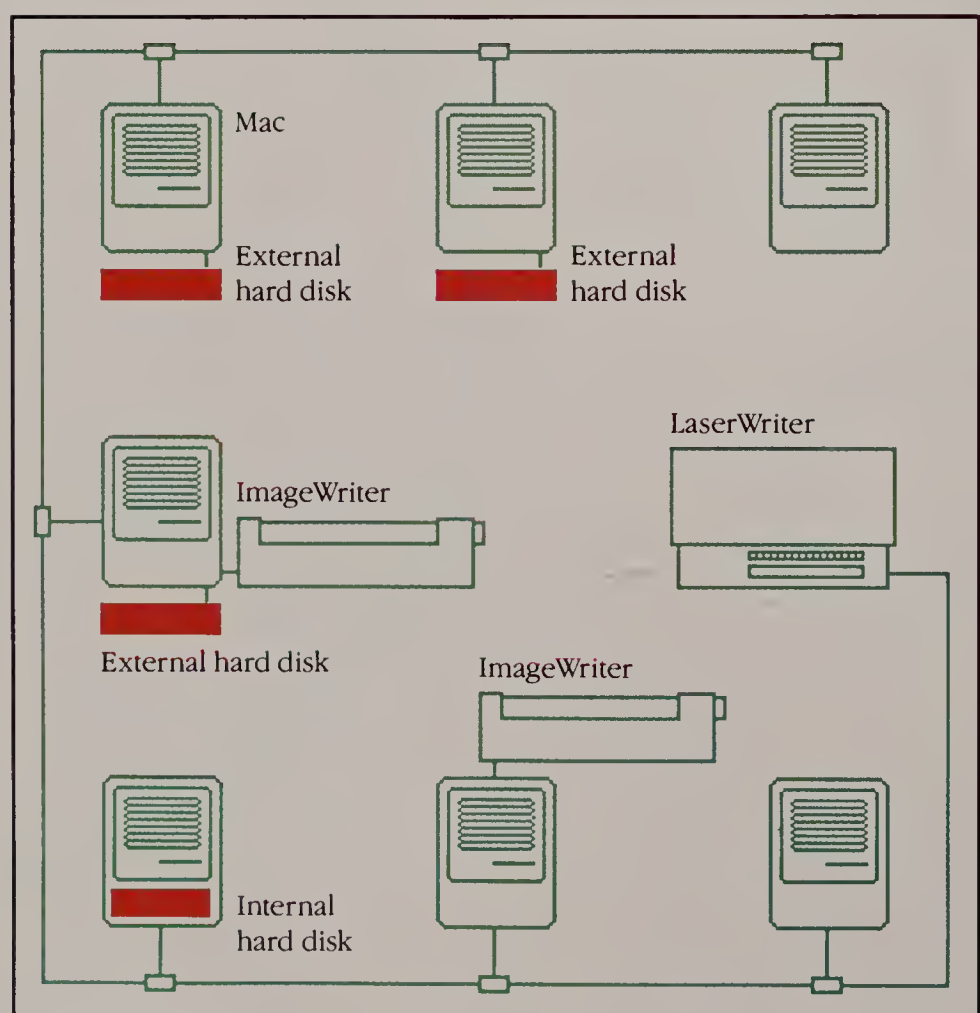
disks, distributed network software like Infosphere's *MacServe,* Centram Systems' *TOPS,* and General Computer's *HyperNet* can turn those hard disks into *disk* or *file servers.*

The differences between a disk server and a file server are subtle but important. A disk server's prime objective is to make a hard disk's capacity available to every member of the network. Disk servers divide a hard disk into various partitions that hold applications and documents, and they usually impose restrictions on the access level granted to the user of a partition. Generally, only one user at a time can write to a particular file within a partition; if several users must write simultaneously to the same file, special multiuser application software is required (see "Sharing Facts").

A file server's prime objective is to allow the network users to share information regardless of how the disk is organized. File servers do not require a special partitioning scheme. Write access to a file is often granted on a first-come, first-served basis. Generally only one user at a time is allowed to modify a particular file. As with disk servers, more than one user cannot write simultaneously to the same file without special multiuser application software. Of the three products tested, *TOPS* and *HyperNet* are file servers, while *MacServe* is a disk server.



Shared Storage
Rather than dedicating one central hard disk as the file or disk server, distributed network software lets users access information stored on any of the network's hard disks.

What's a Net Worth?

Unfortunately, the distributed network picture isn't all rosy. You'll find a distributed hard disk slower than a hard disk attached directly to your machine. And the performance of the hard disks and the host Macs degrades as the network grows (see "Network Test Track").

You can, however, obtain satisfactory performance if you set up a network with AppleTalk's speed limitations in mind. When possible, run applications locally, ideally from a hard disk or a RAM disk; use the server primarily for document storage and sharing. If you store applications on the server, encourage users to copy them onto their own disks.

Infosphere's MacServe

MacServe was the first distributed disk server product shipped for AppleTalk. *MacServe* works with most Mac hard disks, though you should verify your disk's compatibility before buying.

MacServe has its own disk-partitioning software that lets you divide a hard disk into as many as 16 volumes accessible by network members. If your hard disk has its own partitioning system (many do), the *MacServe* manual recommends that you erase and restructure the disk using *MacServe*'s volume manager; the existing volumes on the hard disk can't be used with the network.

This approach forces you to plan how you'll store documents and applications on the server. And because you're starting with a blank hard disk, the files you copy onto it will be stored contiguously rather than being fragmented across the disk, resulting in faster performance.

MacServe also comes with archive software that lets you back up and restore volumes and files, although the version I tested (2.0) could not back up HFS volumes. According to Infosphere's president, Evan Solley, the next version of *MacServe* will back up HFS volumes.

MacServe's partitioning software has a shortcoming that keeps me from being completely enthusiastic about its do-it-my-way approach: the size of *MacServe* volumes is fixed. As a result, HyperDrive users lose the convenience of HyperDrive drawers, which grow and shrink as needed, while MacBottom users must forego the ability to resize volumes.

On the positive side, *MacServe* is the only one of the three with a print-spooling function that allows network members to share an ImageWriter or other printer. When someone prints a document, *MacServe* intercepts data en route to the printer, stores it on the server, then sends it to the printer in bursts while you continue working. However, *MacServe*'s spooler does not work with LaserWriters. You can use LaserWriters

(continues)

Networks Test Track

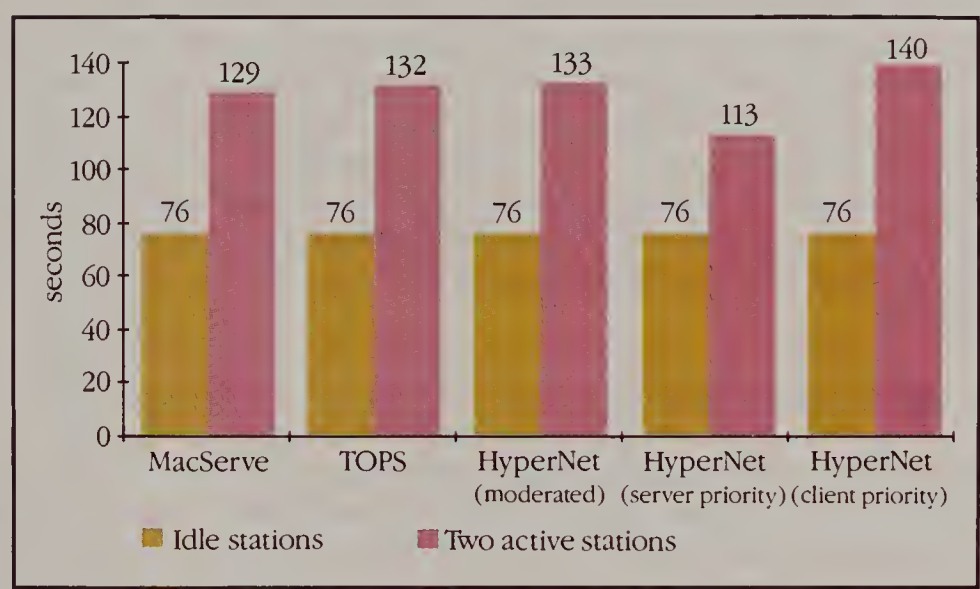
Measuring a network's performance is an inexact science. Influencing factors include the number of stations on the network, the type of hard disk used as server, and most of all, the activities performed by network members. Because every network is used differently, there is no typical activity to measure. Still, conducting the same tests on each product gives an indication of their actual performance.

My network test track comprised two 512K Macs and an Enhanced 512K. A HyperDrive 20 was the server, the Enhanced 512K contained a MicahDrive internal hard disk, and the third 512K used only floppies. I created a 64K *MacWrite* document on the server and duplicated it twice, giving each machine its own copy. Next, I started *MacWrite* locally on each machine (from its disk rather than the server) and opened one of the 64K documents from the server.

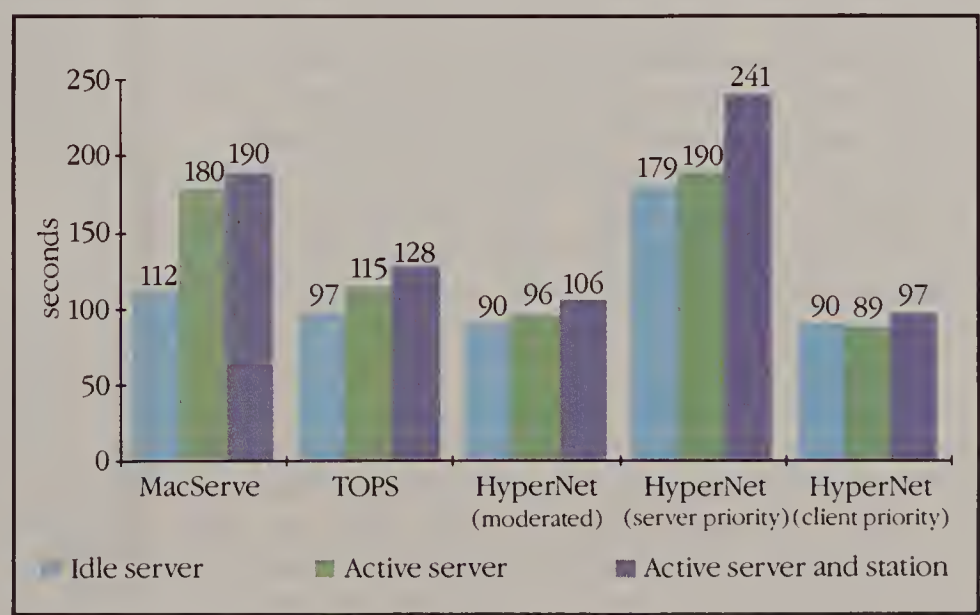
The test measured the time required to replace all occurrences of the word *a* with two pound signs (##). The test comprised five phases. First, I timed the test on the server, with the other network stations idle. Second, I performed the test from a network station, with the server idle. Next, I measured the test from a network station, while the server performed the same search-and-replace operation, revealing how server activity influenced one station's performance. The fourth phase measured the test at one station, while another station and the server performed the operation. This phase showed the impact of other active network users on a station. Finally, I measured the operation at the server while the other two stations performed it also. This step showed the effect of active stations on the server's performance.

Because only *MacServe* private volumes can be modified, a separate *MacServe* volume was created for each machine. Also, *MacServe*'s disk cache was set to 150K. With *TOPS*, the volume containing the *MacWrite* documents was opened using the many-writers option.

The test results are shown in "Server Performance" and "Client Performance." *HyperNet* proved the speediest product of the three; also, the results of its Moderated, Client Priority, and Server Priority settings clearly show an impact on performance. *TOPS* finished in second place.



Server Performance
The effect of user activity on server performance. The completion time for a search-and-replace operation at the server with two network users active.



Client Performance
Network performance from the network user's perspective. The completion time of a search-and-replace operation on a 64K file was measured with up to three active users (including the server Mac). Even in larger network configurations, typically, not all users are active simultaneously.

on a *MacServe* network, but *MacServe* does not decrease the time you spend waiting for a document to print. According to Solley, Infosphere will ship a LaserWriter print spooler in September.

Installing and Administering

To set up a *MacServe* network, you run an installation program that adds the *MacServe* software and desk accessory to the System files on all the hard disks and floppy start-up disks in the network. During installation, you specify a *user name,* AppleTalk's standard way of identifying network members.

You can install *MacServe* any number of times, but the software is encoded with a serial number that permits only one server per package. If you have two or more hard disks that you want to use as servers, you must buy additional copies of *MacServe.*

Once *MacServe* is installed on your hard disk, you run the volume manager utility to create volumes and set up the print spooler and disk cache. You can set the volume size and assign an optional access password as well as designate volumes to appear automatically on the desktop upon start-up. The manager includes other commands to list the AppleTalk users on the network, delete spooled print jobs that haven't been printed, and back up and restore MFS-format volumes.

MacServe in Action

The *MacServe* desk accessory is the key to accessing volumes; when you open the desk accessory, you see a list of the volumes on a server. You can designate a volume as either *private* or *shared.* A private volume can be accessed by only one user at a time and can be modified; a shared volume opens in a locked, read-only mode and can be read by many users simultaneously. The desk accessory also lets you "release" volumes—the network equivalent of ejecting a disk. Releasing a private volume you're done with makes it available to other members of the network.

At present, *MacServe* is geared to offices that use only Macintoshes. However, Infosphere is developing *PC/MacServe,* software that will work with Tangent Technologies' PC/Mac Bridge board to allow PCs to join a *MacServe* network. Until the software becomes available, however, offices with Macs and PCs are better served by *TOPS.*

Centram's TOPS

Centram bills *TOPS* as an "interoperating system" network because it runs on Macs and IBM PCs and will soon run on UNIX-based computers. *TOPS* builds an elegant bridge between computers that usually have to be coaxed into communicating. With a *TOPS* network you can store Mac documents and applications on a PC's hard disk, or vice versa, and copy files between systems with a desk accessory that mimics Apple's *Font/DA Mover.*

TOPS performs its feats by acting as an interpreter between disparate operating systems. Once installed, it intercepts an operating system's disk- and file-related commands and translates them into *TOPS* commands. At the other end of the wire, the process reverses as *TOPS* translates its commands into those required by that operating system.

TOPS's greatest strength is that it doesn't require you to erase and rebuild your hard disks or create all new volumes as *MacServe* does.

When you install *TOPS,* the *TOPS* software and desk accessory are added to the System file. On a PC, you plug in the Centram AppleTalk board and run an installation program that copies *TOPS* utilities to the PC's disk and adds the AppleTalk device driver by modifying the MS-DOS CONFIG.SYS file. *TOPS* disks are not copy protected, but they are encoded with a serial number so that you must purchase a copy of *TOPS* for each member of the network.

Taking TOPS for a Spin

TOPS differs significantly from *MacServe* in its *publishing* function, which lets you make available to the network any information on a disk (floppy, hard, or even RAM). On the Mac, publishing involves opening the *TOPS* desk accessory (see Figure 1), selecting volumes, and clicking a Publish button. Alternatively, with HFS-format volumes, you can select a single folder and publish it—a feat that *MacServe* and *HyperNet* can't match.

You can publish a volume in read-only volumes that are locked against modification, one-writer (preset) volumes that allow the first user who opens a file to modify it, or many-writers mode for multiuser applications.

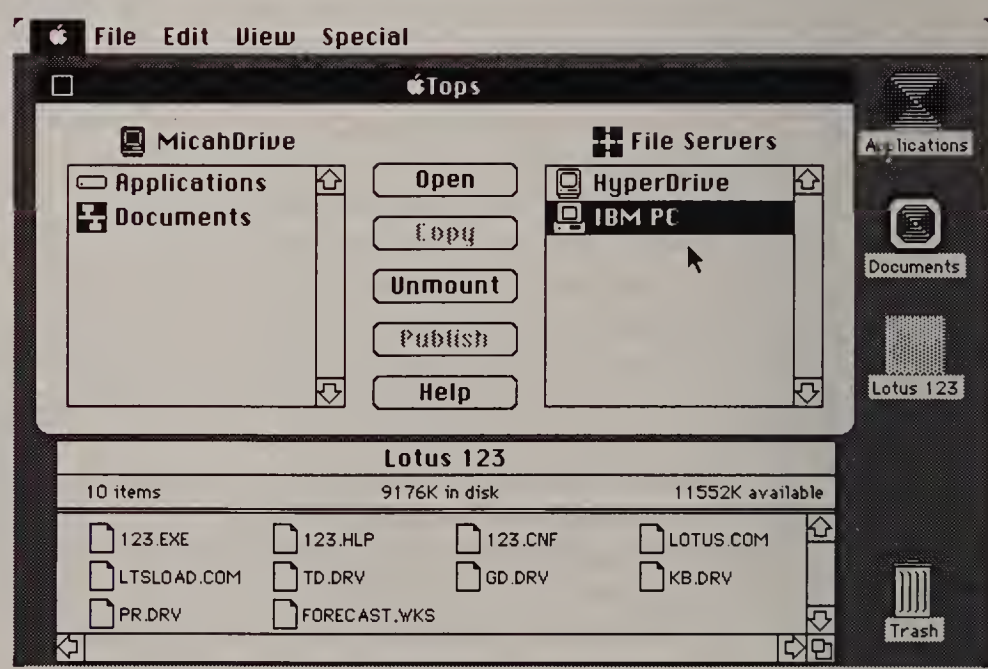


Figure 1

Network users pull down the TOPS *desk accessory to mount volumes that have been published on any file server. An IBM PC volume acts just like a Mac volume; PC programs and documents are displayed using blank icons.*

Sharing Facts

Networks open new possibilities for information sharing, but they also introduce some potential problems. First, making documents available simultaneously to all users requires *multiuser* programs written to operate on networks.

Multiuser capabilities are extremely valuable for database management. But although multiuser data managers allow many users to work with the same database, they allow only one user at a time to modify a given record. Called *record locking,* this process allows only the first person who views a record to modify it.

Currently, Blyth Software's multiuser *Omnis 3* runs with *MacServe.* As this article went to press, Blyth was still working on a version for *TOPS.* And General Computer claims that *HyperNet* also runs existing software written for Corvus networks, including the Corvus version of multiuser *Omnis 3.*

What if you don't use multiuser software but simply run programs intended for a single user? With *MacServe* several users can simultaneously access the same document from a shared volume only if the application doesn't create temporary files as it runs. One way to determine this is to try running the application from a locked floppy disk. Certain applications, such as *Jazz, Excel, Omnis 3,* and *ThinkTank* version 1.2, will work, while others, such as *MacWrite, Word, MacPaint,* and *PageMaker,* will work properly only with files stored in private volumes.

With *TOPS* and *HyperNet,* numerous users can open the same file, regardless of where the file is stored, but only the first person to open the file is allowed to modify it; others can examine it or use the Save As command to make a copy.

Mounting a published volume involves a similar process. A network user selects the volume's name in the *TOPS* desk accessory and clicks Mount. Once mounted, the volume appears on the desktop, complete with icons—even if it originated from an IBM PC's hard disk. Conversely, a Macintosh disk directory resembles a PC directory when it's summoned by MS-DOS (the IBM PC's operating system) and mounted on a PC. HFS folders even appear as MS-DOS subdirectories.

TOPS shines when you use Mac applications that can read files created by PC programs. With *Excel,* for example, you can directly open and modify Lotus *1-2-3* worksheets stored on a PC's hard disk. *TOPS* also simplifies moving *Microsoft Word* files between PCs and Macs. You can use the Mac *Word Convert* utility to open the PC *Word* file, then save it in Mac *Word* format on either the PC or the Mac.

Possible Pitfalls

One potential drawback of *TOPS*'s serving process is its inability to publish Macintosh volumes unless they're mounted on the server machine. This doesn't affect HFS-compatible disk drives, but if you're using a HyperDrive, you have to open all the drawers you want to publish. Combine the published drawers with the remote volumes that you mount, and you'll have a cluttered desktop and possibly not enough memory to work with all the volumes you need. You can avoid this snag simply by storing frequently shared applications and documents in the start-up volume.

TOPS also requires network users to exercise caution when deleting files. MS-DOS doesn't ask for verification when deleting files, so it's easy to delete a Macintosh application, its work files, or even a System file.

TOPS succeeds in smoothly uniting Macs and PCs and provides PCs with an excellent way to access LaserWriters. But even offices that use only Macs can greatly benefit from *TOPS*—by cashing in on its clever file-copying capabilities.

General Computer's HyperNet

Designed specifically for HyperDrive-equipped Macs, *HyperNet* lets multiple Macs access a HyperDrive's drawers. Not only is it an easy-to-use link to the HyperDrive's storage, but it also adds limited multiuser capabilities to applications that create work files.

The *HyperNet* installer adds the *HyperNet* serving software and desk accessory to the HyperDrive's system. You can also install *HyperNet* on floppy disks and other hard disks, but only as a user (or in *HyperNet* parlance, a *client*). If you want to designate additional HyperDrives as servers, you must buy more copies of *HyperNet.*

To access a HyperDrive drawer from a remote Mac, you must open the *HyperNet* desk accessory and then select the desired server and drawer. *HyperNet* doesn't impose an explicit "private" or "shared" mode upon a server's drawers. Instead, it allows many users to access the same file but gives only the first user modification privileges—much like *TOPS*'s one-writer publishing option.

My prerelease copy of *HyperNet* did not allow users to access HFS-format drawers. A General Computer representative noted that HFS drawer support would probably be missing from the first *HyperNet* release but would be provided shortly thereafter. According to General Computer, *HyperNet* was scheduled for shipping in late August. If network support for HFS drawers is not available, you may have to reorganize your HyperDrive server to place network applications and documents in an MFS-format drawer.

Network Niceties

The *HyperNet* desk accessory adds a Server menu to the menu bar; its commands fine-tune the network's performance according to its members' needs. The Client Priority command tells *HyperNet* to honor all disk access requests from clients as they come in and to give them as much server time as they need. The Moderated command performs a complex juggling act that measures the mouse and keyboard activity on the server and then adjusts clients' server time accordingly. The Server Priority command prevents new users from accessing the server and restricts the amount of server time given to users who have already signed on. The preset option is Moderated, but the Server Priority setting is useful if you're performing a lengthy, disk-intensive task, such as sorting a large database.

HyperNet's other nicety helps eliminate problems that can occur when more than one user runs an application that creates temporary work files, such as *MacWrite, MacDraw,* or *MacPaint*. Because these applications use specific names for work files (such as Paint 1 or ScrapFile), the application erases the first user's work file when the second user opens the application; in some cases, the application can crash. *HyperNet,* however, contains a resource that lists the names of the work files that popular applications create. If one of those applications is opened, *HyperNet* appends a unique number to the work file's name, thus eliminating a collision. The Add Special Files command in the *HyperNet* installer lets you specify names of other application work files that may be created in the future.

Network Shopping

One factor to consider when choosing a distributed network package is the makeup of the network. *HyperNet* is suited only for those networks using HyperDrives as file servers, whereas *MacServe* and *TOPS* take a much more universal approach: they're tailored for networks that use hard disks from different manufacturers.

MacServe is ideal for hard disks that lack partitioning, backup, and spooling software, such as Apple's HD-20, while *TOPS* is unequaled at transferring information between Macs and PCs.

For those setting up a network primarily to exchange files, *TOPS* offers more flexibility than either *MacServe* or *HyperNet*—by letting any user publish volumes instead of providing only one server unless you buy additional copies.

Software compatibility is another consideration. Although few multiuser applications currently exist for the Mac, you should verify the network software's compatibility with the package you want to run.

Most importantly, the network software must be reliable and should be able to recover from network discontinuities. I tested recoverability by unplugging the AppleTalk connector during a network operation. *MacServe* and *TOPS* performed admirably, displaying a message acknowledging the broken connection and its attempt to reconnect. When the AppleTalk connector was reattached, the connection was restored. *HyperNet* was still under development, so I can't comment fairly on its reliability. But regardless of the network software chosen, network users will benefit greatly from the ease with which they can exchange information. □

Jim Heid is a Contributing Editor of Macworld.

MacServe
Infosphere
4730 S.W. Macadam Ave.
Portland, OR 97201
503/226-3515
List price: $250

TOPS
Centram Systems West Inc.
2372 Ellsworth Ave.
Berkeley, CA 94704
415/644-8244, 800/227-3900 for orders only, 800/632-2122 in California for orders only
List price: $149 per station (Macintosh), $389 per station (IBM PC, including AppleTalk board)

HyperNet
General Computer Corp.
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Cambridge, MA 02142
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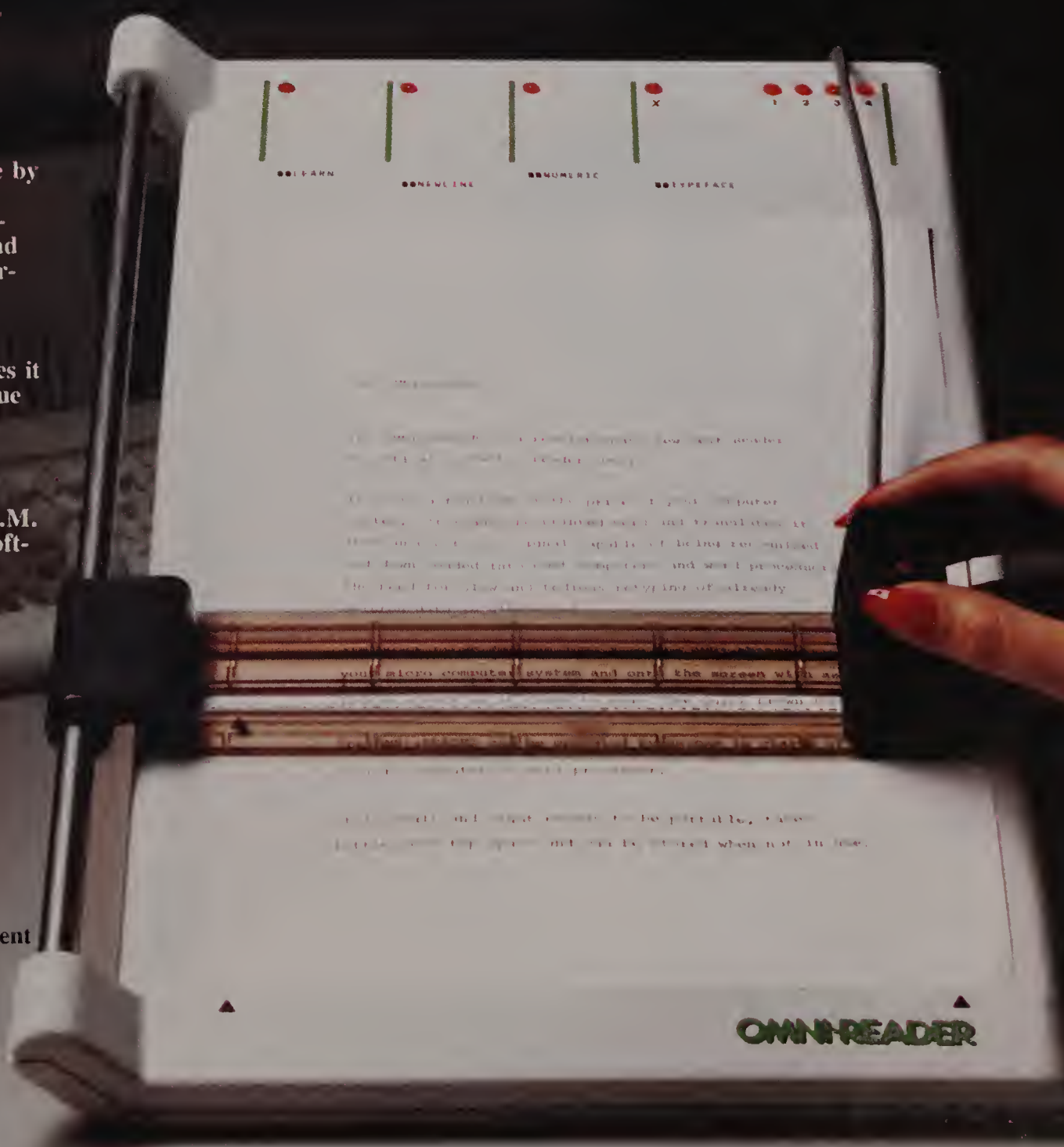

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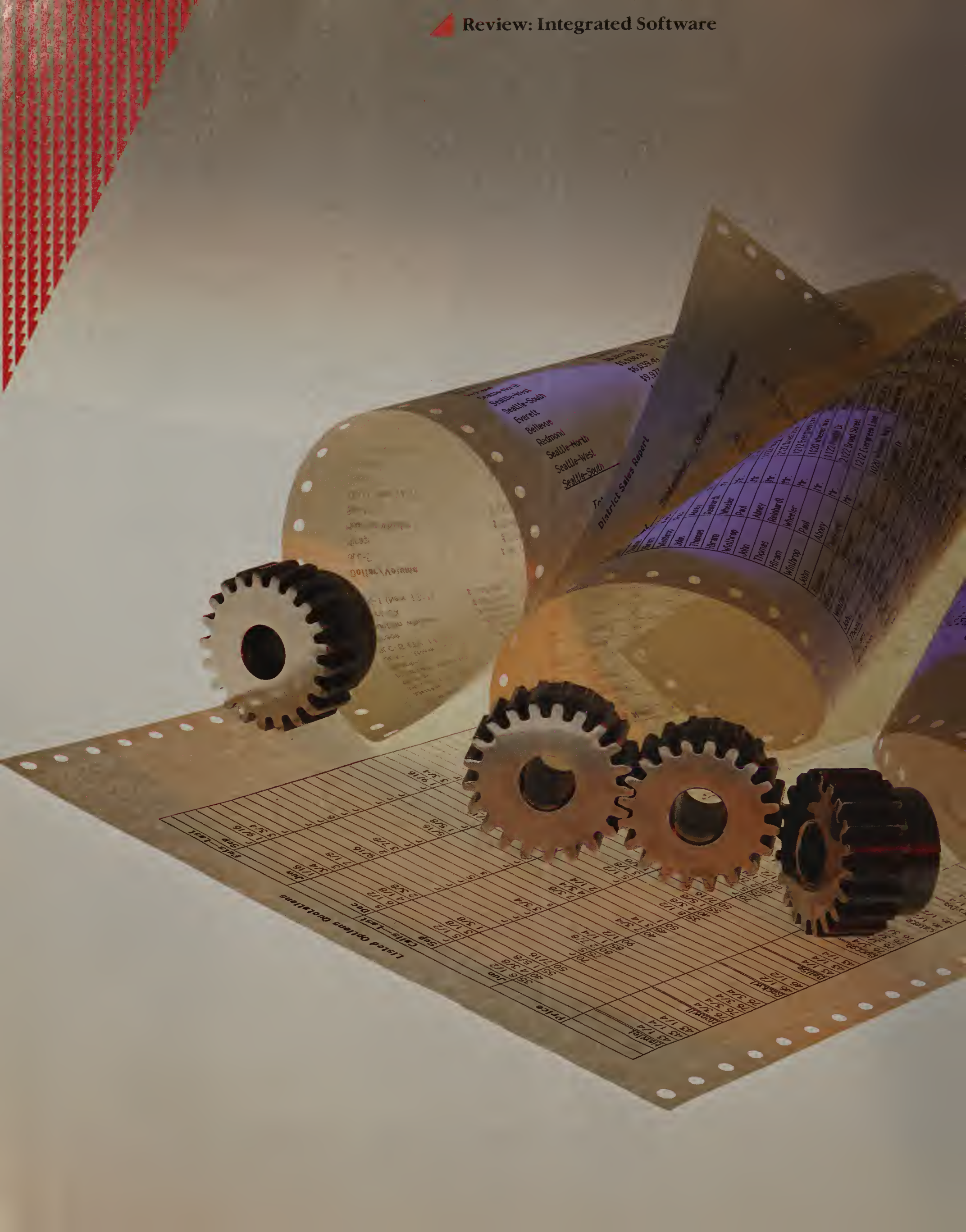
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Microsoft's New Works

Danny Goodman

Microsoft Works, with its four refined productivity modules, stacks up well against the competition

Integrated software is a less popular buzzword today than it was a year ago when Lotus Development's *Jazz* hit the streets. Yet integration still appeals to experienced Macintosh users, whose work is rarely confined to a single application.

The search for integration has led some Mac owners to *Jazz,* despite the criticism the program has drawn for its memory appetite on a 512K Mac and lack of depth in several of its modules, particularly word processing (see "All That Jazz," *Macworld,* September 1985). Other users, desirous of more powerful applications, fashion customized integrated systems consisting of full-scale applications and desk accessories joined at the hip by *Switcher.*

But the Macintosh newcomer faces many software choices before taking the machine out of the store, especially since Apple no longer bundles *MacWrite* and *MacPaint* with its hardware. Is *Word* the right word processor, or will *MacWrite* suffice? Do I need the power of an *Excel* spreadsheet, or will *Multiplan* handle my sales forecasts? With each database program defining its own philosophy, which one should I use? Will it be easy to combine spreadsheet and database information into a word processing document? If I choose an integrated program like *Jazz* and a more powerful program comes along, will I be able to transfer my data?

Unfortunately, Macintosh newcomers usually aren't experienced enough with either the machine or its software to answer these questions with certainty. Microsoft's new *Works* program, however, may help put off those critical decisions while providing a capable set of productivity applications with which to get started. With *Works,* if you later discover that you need a spreadsheet with macros, a communications program that performs unattended information retrieval, a word processor capable of columnar output, or a relational database, you'll be experienced enough to make a more informed software choice. As a bonus, you'll likely be able to export your *Works* data into the more powerful program.

Family History

Because of its integrated nature, *Works* begs comparison with *Jazz.* In this regard, an important difference between the two should be made clear from the outset. In *Jazz* some integration processes—those that link spreadsheet, graphics, and database information to a word processing document—are performed using HotView. HotView maintains a link between a source document and a word processing document. A change made to a spreadsheet number, for instance, automatically appears in its HotView copy in the word processing document. In *Works* you

FRED STIMSON

shift data around only via the copy-and-paste method (with the exception of mail merging). Any link to the source material is severed the instant the data is copied into the Clipboard. *Jazz* is effective if you prepare word processing documents that often contain spreadsheets or graphs. But if your work is more generalized, the copy-and-paste method is sufficient.

The Environment

When you start *Works,* you enter into a separate world with its own desktop (see Figure 1). Documents are generated from one of four applications: word processing, database, spreadsheet, or communications. Each document occupies its own window on the screen beneath a single menu bar; as you activate a document window, the menu bar changes to display the menus specific to that document's application. Up to ten document windows in any combination of applications can be open at once, up to the limit of available memory. Since all *Works* documents reside in RAM when they're loaded, you should not expect to have many large documents open at once on a 512K Mac. Even so, *Works* leaves up to 240K of a 512K Mac available for documents.

A Window menu, which appears in all *Works* applications, offers a list of all open documents. Choose a document from the menu to activate its window. This menu displays not only the document titles but an abbreviation for each document's type (for example, *SS* for spreadsheet) and the size of each document in kilobytes. Therefore, you can see at a glance how much RAM your documents occupy and compare those figures with the free memory count in the About Works dialog box accessible via the Apple menu.

Works also incorporates a feature I suspect we'll see in future Microsoft Mac products. In several operations, such as spreadsheet recalculations or word processing reformatting off screen, you may proceed with menu selections or other actions even when the program is busy crunching away elsewhere. Instead of turning the cursor into the wristwatch icon, *Works* slightly modifies the cursor—placing a small empty circle in the center of the text insertion pointer or hollowing out the head of the pointer arrow—to indicate this intermediate stage, and some actions may slow down.

Word Processing

At first glance, *Works'* word processing module looks like a *MacWrite* clone. But on closer scrutiny, the program reveals a number of features that more closely resemble those found in *Microsoft Word,* plus some features *Word* should have.

For instance, page numbers appear on the screen in the vertical scroll bar thumb (the white box) as you type a document. Only two digits fit in the tiny box, so if your document extends beyond 99 pages—a single document can grow to over 200 pages on a Mac Plus—only the two right-most digits appear.

You can adjust tabs, margins, justification, and line spacing for each paragraph just by placing the text insertion pointer anywhere in the paragraph and choosing the desired Format menu item or adjusting the on-screen ruler. The ruler, which remains at the top of the screen, reflects the settings for the paragraph in which the text pointer is located. As with *Word,* clicking once in the margin to the left of the line selects a line of text, and double-clicking in the left margin selects an entire paragraph. Headers and footers, which are restricted to one line each and are specified in the Page Setup dialog box, are not displayed on the screen, however.

A particularly convenient feature lets you copy a paragraph's format and paste it into other existing paragraphs. This lets you draft an outline straight down the left margin of the page and later adjust the margins and indentations for each outline level. Each level's format is copied by placing the pointer in the paragraph and choosing Copy Format from the Format

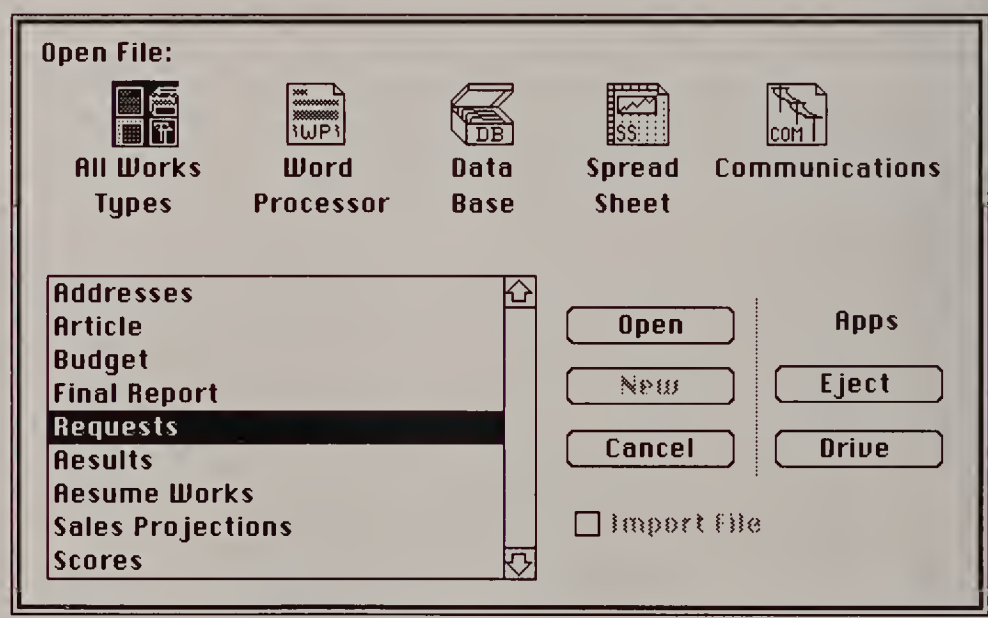

Figure 1
Documents are generated from one of four applications (word processing, database, spreadsheet, or communications). Each application has its own menu bar.

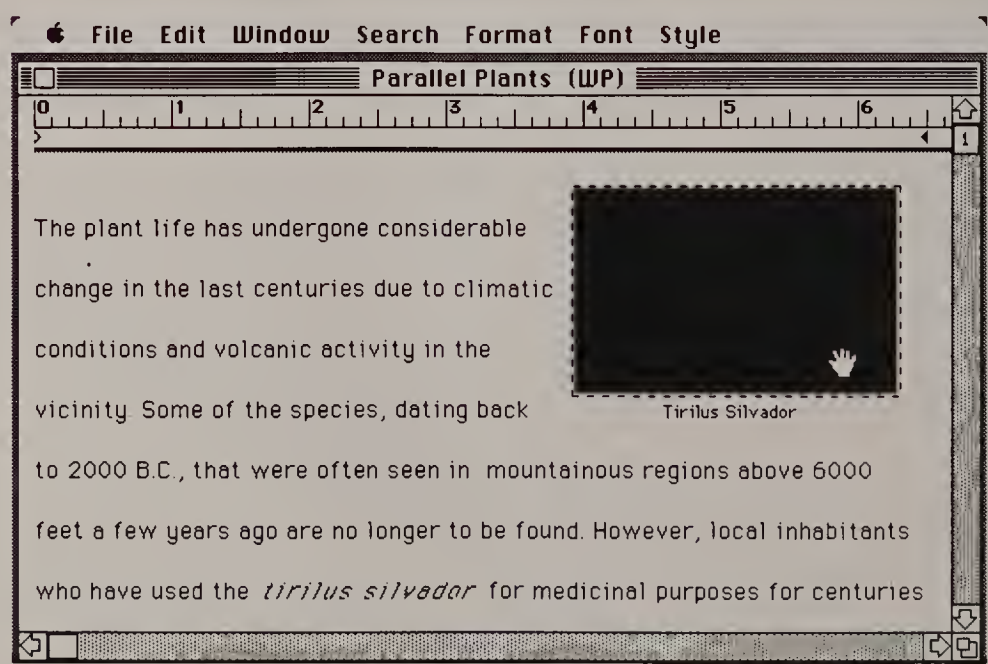

Figure 2
Works' *word processor imports graphics via the Clipboard. Graphics are overlaid on the page like a transparency, so you can type in or around graphics. You can also draw lines and borders around text or graphics using the word processor's Draw capability.*

Tale of the Tape

	Feature	Works	Jazz	Excel/ Word/File
Spreadsheet	Maximum worksheet size	9999 by 256*	8192 by 256*	16,384 by 256
	Worksheet linking	no	no	yes
	Cell protection	yes	yes	yes
	Spreadsheet functions:			
	Database	0	7	7
	Date/time	0	11	10
	Financial	8	5	8
	Logical	10	10	10
	Math	11	15	11
	Special-purpose	8	11	13
	Statistical	8	7	11
	Text	0	17	8
	Trigonometric	9	7	7
	Total functions	54	90	85
	User-definable function	no	no	yes
	Date arithmetic	no	yes	yes
	Cell naming	no	yes	yes
	Macros	no	no	yes
	Turn off grid lines	yes	yes	yes
	Change fonts	no	yes	yes
	Bold/underline single cells	yes	no	yes
	Split windows	yes	no	yes
Graphics	Chart types available	5	10	42
	Manual scaling	yes	yes	yes
	Combine chart styles	yes	yes	yes
	Fonts available	1	any	any
	Ability to create arrows	no	yes	yes
Database	Maximum number of records	memory	memory	memory
	Maximum field length	248	254	32,767
	Maximum number of fields	60	100	1023
	Number of sorting levels	1	3	9
	Entry form design capability	yes	yes	yes
	Computed fields	yes	yes	yes
	Report subtotals	yes	yes	yes
	Preview reports	no	yes	yes
Word Processing	Document length 512K	60-80	17-20	disk space
	Document length 1024K	180-240	17-20	disk space
	Search and replace	yes	yes	yes
	Headers and footers	1 line each	1 line each	unlimited
	Mail merge	yes	yes	yes
	Paste graphics	yes	yes	yes
	Draw graphics	yes	no	no
	Dynamic page breaks	yes	yes	no
Communications	Terminal emulation	no	yes	n/a
	File conversion	yes	yes	n/a
	Xmodem	yes	yes	n/a
	MacBinary	yes	no	n/a
	Auto-dial	yes	yes	n/a
	Auto-log-on	no	no	n/a

**Because both* Works *and* Jazz *keep all open documents in RAM, measurements such as usable spreadsheet cells or word processing pages will be smaller if multiple documents are open at one time.*

menu. Then place the pointer in each line at that level of the outline and choose Paste Format from the Format menu. Instantly, *Works* adjusts the margins and indentations.

Page size can be selected from a menu of five standard sizes plus a custom one, which can be from 1 inch square to 273 inches square (anything more than 15 inches wide must be printed in the wide printing orientation).

The Works module is not a word processor crippled to fit in an integrated package.

Works handles pasted graphics differently than previous word processors. In *MacWrite* and *Word* each image, no matter how wide, occupies a band across the entire page, and you cannot type inside it. In *Works,* however, graphics are overlaid on the writing area like a transparency. You can type text on any line within the area of the graphic to highlight it, make notations for readers, or even wrap text around the illustration.

Not only that, but you can draw lines and borders around text or imported graphic elements from within the word processor. Choosing Draw from the Edit menu calls up a dialog box displaying lines, circles, rounded rectangles, and rectangles in three line thicknesses (see Figure 2). Then you drag the cursor on the screen to create the shape, just like using *MacPaint.* You are limited to drawing within one window, but once a picture is drawn, you can select it and drag it around in all directions.

Rather than being just a word processor crippled to fit inside an integrated environment, the *Works* module stands well

Tale of the Tape
This table compares the key features of Works, Jazz, *and a combination of three powerful Microsoft stand-alone products:* Excel, Word, *and* File. Excel's *specs were used for the spreadsheet and graphics categories,* Word *for word processing, and* File *for database.*

by itself. It also serves as a good training ground for the possibilities of Microsoft *Word*.

Spreadsheet

Riding high on its success with *Excel,* Microsoft has incorporated a workable subset of the power user's tool into *Works*. The *Works* version lacks macros, but I've discovered that many *Excel* owners have yet to explore macros' possibilities. So while macros are nice if you know what to use them for, you can certainly be productive without them. You can add a modicum of macro support, incidentally, with an external macro processor such as *Tempo*.

The spreadsheet lacks power features such as macros but is nearly as capable as Multiplan.

The table "Tale of the Tape" compares the specifications of the spreadsheet functions of *Works* and *Jazz,* as well as *Excel*'s heady capabilities. The total number of cells is an irrelevant figure, because it is always greater than memory allows. A better measure of capacity is the number of cells you can fill for a given amount of memory. But this can also be misleading, because cells with formulas take up more memory than those with simple values. The figures in the table are for values only. In any case, *Works*' spreadsheet capacity is sufficient for typical business applications.

In the function department, *Works*' spreadsheet is noticeably weak in two important categories: date and text functions. Date functions, in particular, can be important in many spreadsheet applications, such as automatically calculating the number of days a customer's invoice is late or updating a spreadsheet. In addition, the program has only 54 built-in functions, compared to 85 for *Jazz* and 90 for *Excel*.

While *Works* doesn't let you select a spreadsheet font other than Geneva, you can boldface or underline the contents of individual cells for added emphasis. You also have the option of turning off the grid if doing so makes your spreadsheet easier to read.

In *Works,* graphics features are built into the spreadsheet application. *Works* graphics are not as flexible as those of *Excel,* but some tasks are easier; for instance, labels in a distant row can be specified to act as graph labels (in *Excel,* labels must be adjacent to the numbers in the spreadsheet). A graph is "attached" to its spreadsheet and given its own name. When you change a number in the spreadsheet, the graph updates automatically.

Graphs can be copied to the Clipboard and pasted into a word processing document, or they can be pasted into *MacDraw* for enhancement. Each line, rectangle, or group of text characters is a *MacDraw* object. Text fonts and sizes can be changed as desired; rectangles can be filled with different patterns; and other *MacDraw* elements can be added to improve the picture. Then that image can be copied and pasted into any word processing document.

The spreadsheet lacks power features like macros and worksheet linking but is nearly as capable as *Multiplan*. Fortunately, if you decide to upgrade to *Excel,* you can transfer your *Works* spreadsheets to *Excel* by saving the documents in the SYLK format, which *Excel* accepts.

Database

Of the four *Works* modules, the database application is the one that will likely be the most confusing for newcomers.

Designing a new database starts out simply enough. A dialog box asks for field names, and the program instantly assembles a data entry form, whose layout you can change by dragging the elements around the screen. Field names and lengths can be changed at will, even after you've entered data. Field types (text, number, date, and so on) are also set with a choice-filled dialog box. You can switch between a data entry format and a spreadsheet-like display of your data records with a double-click of the mouse (see Figure 3). In the spreadsheet display, you can rearrange the order of the fields by dragging them to the desired spots, as well as change the column width.

Searching and selecting records in either the data entry or spreadsheet format is also straightforward, with the help of dialog boxes that appear when you make a selection from the Organize menu. Record selections can be narrowed down with up to five selection rules at once.

Reports are attached to a database, just as *Works* charts are attached to a spreadsheet. However, designing your first reports will be difficult. It is not a particularly intuitive procedure to eliminate fields from a report. You must experiment with margin settings in the Page Setup dialog box and flip back and forth between that dialog box and the report design window.

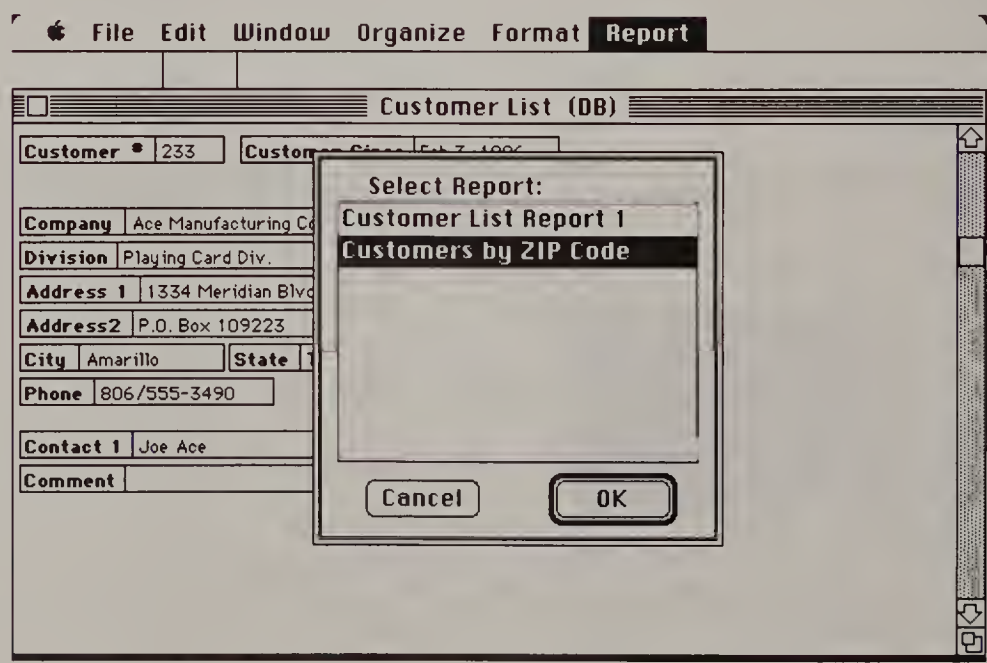

Figure 3
Fields in a Works *database entry form can be laid out as you please or in a spreadsheet-like format. Reports are attached to the database, and you select the one you wish to view from the Select Report dialog box.*

Although you can't preview printouts on screen, you can at least perform Copy Totals—a special copy operation that puts the total and subtotal lines of a report into the Clipboard—and paste the copies into a word processing document.

One other drawback to the reporting function is that you cannot print mailing labels while in the database. You must instead merge database records into a word processing template previously set up to handle labels. Merging is a simple task, fortunately, but I consider mailing labels more of a database reporting task than a word processing task.

Communications

The *Works* communications module is simple yet practical. The module is not equipped for special terminal emulations, so if you plan to access a mainframe computer, it must be able to work with dumb terminals.

Communications settings (baud rate, parity, serial port, and so on) are adjusted by means of a dialog box similar to the one in *MacTerminal*. Dialing is semiautomatic; when you choose Dial from the Communications menu, a directory of eight phone numbers appears on the screen. Clicking on the desired entry's Dial button starts the dialing process through the modem. No provision exists for automatically logging on to the system you are dialing, so you have to type the various account numbers and passwords required by a commercial database service.

Uploading and downloading are possible in both straight text (ASCII) mode, called Capture, or with error-checking protocols. *Works* supports both Xmodem and MacBinary protocols. Xmodem is frequently used to assure accurate transmission of text information, while MacBinary is used to send Macintosh documents or programs. Most programs available on public domain bulletin boards, for example, can be downloaded only with the help of MacBinary. When a MacBinary file is received, it automatically takes on the original file's icon, while an Xmodem file is received as a *Works* word processing file.

If the ASCII or Xmodem information you've downloaded belongs in a spreadsheet or a database, you have to copy and paste it into the desired *Works* document; the program lacks *Jazz*'s ability to download data directly into the document. On the plus side, however, *Works'* communications facility can run entirely in the background while you do other work. For example, if you are downloading a large Xmodem or MacBinary file, you can start the downloading process and move on to other *Works* documents. When the file transfer is complete, *Works* beeps to let you know you should return to the communications window to request another file or log off the system.

Of all the integrated packages I've used, Microsoft Works strikes me as the most balanced.

The Big Picture

Of all the integrated programs I've used on both the IBM PC and the Macintosh, *Microsoft Works* strikes me as the most balanced. In other packages one application usually stands out as being the core module, while the rest appear tacked on—*Jazz*'s spreadsheet, for instance, is that program's star, while its word processor appears tailored for someone who writes very little. *Excel* is predominantly a spreadsheet with admirable graphics abilities, while its database functions place a distant third. All four *Works* modules, however, are solid, capable workers. Although none offers the depth required of a power user, none, with the possible exception of communications, is given short shrift. Even though data exchange between *Works* documents occurs only by way of the Clipboard, the program feels more homogenous than *Jazz*. I think it's because the *Works* modules seem similar to each other. *Jazz* displays a largely different set of icons and boxes in a two-line area beneath the menu bar (called the Console) for each application. *Works,* on the other hand, displays at most a one-line entry box, located below the menu bar in the spreadsheet and database modules, which is identical in both modules. All other differences among modules are handled by changes in menus.

I originally felt that *Microsoft Works* should be described as training wheels for the real world of Mac applications. But the more I work with it, the more I believe that it will likely provide all the capability many Mac owners need (although a graphics program such as *MacPaint* or *MacDraw* would be a suitable addition to any Mac library).

Perhaps the best feature of *Works* is that you are not locked into it forever. You can always step up to power user ranks in whatever applications you find useful and still have *Works* for general tasks. Nothing you produce or learn with *Works* will be wasted. Unless you are buying the Mac to perform a job that specifically requires the powers of a *Helix, Excel,* or similar program, you won't go wrong with a copy of *Works.* □

Danny Goodman is a Contributing Editor of Macworld *and is the author of* Hands-On Excel *(1986, Scott, Foresman & Co.).*

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Microsoft Corp.
16011 N.E. 36th Way
Box 97017
Redmond, WA 98052-6399
206/882-8080
List price: $295

Jazz
Lotus Development
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Cambridge, MA 02142
617/253-9150
List price: $395

Excel
Microsoft Corp.
16011 N.E. 36th Way
Box 97017
Redmond, WA 98073-9717
206/882-8080
List price: $395

LightspeedC brightens the day for programmers who seek speed and efficiency in a C compiler

C in a New Light

Jim Takatsuka

Developing a Macintosh application involves a seemingly endless cycle of writing, testing, and modifying program code. *LightspeedC,* Think Technologies' latest offering for the Macintosh, gives C programmers some relief from the inescapable development cycle.

LightspeedC combines a multiwindow text editor, a compiler, a linker, and a number of programming utilities into a single application much as Microsoft's *Excel* integrates a spreadsheet, a database, and a graphics program. Because of the integrated environment, *LightspeedC* does not require a separate executive program, as do other development systems. Traditionally, the editor, the compiler, and the linker are separate, stand-alone applications. In such an environment, you create the source file with the editor and then run the executive program to compile and link the application automatically. *LightspeedC* streamlines the development cycle, allowing you to spend more time programming and less time waiting on the system.

Managing the Project

All application development with *LightspeedC* centers around the project document. The project document lists all the source files and libraries that make up the program under development. The project document also tracks the relationships between the various source files. As a result, when you modify a source file, source files affected by the change are automatically recompiled. Unlike the UNIX "make" command, from which it is derived, this feature does not force you to specify a list of dependent source files.

After you select all the source files and libraries that make up the application, you run the project. *LightspeedC* compiles the necessary source files and links the application, leaving it set up in memory. If any errors are encountered during compilation, the window containing the erroneous file is brought to the front, the cursor is positioned in the offending line, and a dialog box (similar to the one used in Mac Pascal) displays the error message. If no compile or link errors are found, *LightspeedC* launches the application.

The compile-and-link cycle is so quick that it's easy to fine-tune your application by making one change at a time. Because the linker is incredibly fast, linking is virtually transparent. *LightspeedC* excels at recompiling, relinking, and launching a program once you have made changes (see Table 1). And when you exit the program, you return to *LightspeedC,* not the Finder.

Editing a Program

LightspeedC's weakest link is its text editor. For the most part, the editor is much like the Edit program in Apple's *Macintosh Development System (MDS)* and Consulair's *Mac C*—not bad, but a bit too generic compared to the rest of the *LightspeedC* system.

To its credit, the *LightspeedC* editor is not limited to opening four windows at a time. And, because it uses its own text processor in lieu of the ROM text editor, text scrolls very smoothly, even when you edit large files.

One outstanding feature is the inclusion of commands that allow you to search for and replace complex text patterns. Using commands similar to those of the UNIX utility "grep," you can search for patterns instead of literal strings. For example, instead of searching for the string "#include <QuickDraw.h>," you can search for "#include <XXX.h>," where "XXX" can be any string.

The Replace command is equally flexible. After finding all the strings that match the pattern "#include <XXX.h>," you could, for example, replace each occurrence with "#include <:MacIncludes: XXX.h>," replacing everything but the string "XXX." The Search and Replace commands also move very quickly through multiple files.

The program could be enhanced by adding an Undo command, the ability to use the cursor keys on the Macintosh Plus's keyboard, and the ability to set a default font and tab configuration. (Font and tab configurations are, however, stored with each document.) Housekeeping commands to stack and tile windows, plus the zoom box found in Finder 5.3, would also be welcome additions.

Compiling in a Flash

LightspeedC's compiler is very fast. Using a Mac Plus with an external 800K floppy disk, I was able to compile over 6200 lines of code per minute. With a hard disk, the compilation is even faster.

LightspeedC correctly compiles all the functions and procedures described in *Inside Macintosh,* including those labeled "not in ROM." However, to access the additional trap calls in the 128K ROM, you must first load a separate library file. This is an inconvenience that Think promises to address in the next release. Floating-point

PHOTOGRAPH BY MEL LINDSTROM

arithmetic is executed by calling the SANE (Standard Apple Numerics Environment) routines, which reside in the 128K ROM on a Mac Plus and are loaded into RAM on a 512K or 128K Mac.

LightspeedC's ability to declare C functions and procedures as Pascal types is invaluable when you're working with those Toolbox routines that follow Pascal's calling conventions. This eliminates the need for assembly language "glue" routines, which other C compilers require.

The compiler's unique method of error reporting has its good and bad points. If your source code has only a few errors, it's convenient to correct the problems one at a time. However, I would have liked to see an option to save a list of errors in a text file so that I could correct errors before recompiling.

The sheer speed of the compiler makes it a pleasure to use. However, several areas could stand improvement. The compiler can neither incorporate in-line assembly language routines nor produce assembly language source code.

The lack of assembly language support is a hindrance when you want to optimize a program. In fact, you must have *MDS* to use any assembly language subroutines.

HFS compatibility is another area that could be improved; *LightspeedC* works fine with HFS as long as you specify an explicit path name for each file the compiler must read.

LightspeedC lacks the ability to associate a search path with a particular type of file, as Consulair and Manx do in their HFS-compatible versions. However, the lack of true HFS compatibility in *LightspeedC* is more an inconvenience than a problem. Think promises that *LightspeedC* will be completely compatible with HFS in the next release.

Linking without Overhead

One of the nicest features of the *LightspeedC* development system is the speed of its linker. Linking an 8K program took less than 2 seconds. Even for very large programs (over 150K), linking shouldn't take more than 5 seconds.

Because linking is extremely fast and because *LightspeedC* automatically invokes the linker when compiling is done, linking adds very little overhead to the development cycle. The linker is also "smart." When you link the final application, the linker removes any unused code, thus minimizing the size of the final application.

Another timesaving feature of the linker is that it doesn't require a separate file to control the linking process. Instead, the linker gets the information it needs from the project manager. The linker can also automatically include a resource file in the finished application.

A utility program is provided with the *LightspeedC* system that converts a .REL file created by *MDS* into a *LightspeedC* library. Unfortunately, the conversion utility is overly sensitive to the file format and follow the *MDS* .REL file format. TML Pascal .REL files convert nicely; Consulair .REL files, which contain additional information, cannot be converted.

Speed-Reading

The well-written, comprehensive documentation accompanying *LightspeedC* provides an abundance of useful information. In addition to a clear, easy-to-understand introduction to the *LightspeedC* system, the manual contains a chapter on bugger included with *LightspeedC*), a description of C versus Pascal calling conventions, and a reference manual of *LightspeedC*'s implementation. Even reference guides for *RMaker* and *ResEdit* (two utilities used to create resources) are included in the appendixes.

Value of Time

Think Technologies has acknowledged *LightspeedC*'s minor shortcomings and has promised to address them in a future update. Even with these flaws, however, it's still a complete and robust C development system.

At a suggested retail price of only $175, *LightspeedC* is well worth the price—comparing favorably in both features and performance with C development systems costing $400 and up. Because of its low price and relative ease of use, *LightspeedC* also provides an excellent opportunity for C programming novices to get started on the Mac. □

Jim Takatsuka, a sales support analyst for Apple Computer in San Francisco, is coauthor of Using the Macintosh Toolbox with C *from Sybex.*

LightspeedC
Think Technologies
420 Bedford St.
Lexington, MA 02173
617/863-5590
List price: $175

Table 1
LightspeedC *shines when recompiling source code, once you have made changes. The benchmark programs were run on a Macintosh Plus with two 800K floppies. The Sieve programs were written using standard C input/output statements.*

	Consulair Mac C version 4.54	Manx Aztec C version1.06H	MegaMax C version 2.1	LightspeedC version 1.02
Sieve with register variables				
Object code (bytes)	13,056	14,192	5520	10,868
Run time (seconds)	3.67	3.23	3.82	3.28
Compile time (seconds)[1]	54	23	63	29[2], 14[3]
Sieve without register variables				
Object code (bytes)	13,056	14,244	5534	10,912
Run time (seconds)	6.22	5.85	6.2	5.63
Compile time (seconds)[1]	54	23	63	29[2], 14[3]
Sample program[4]				
Object code (bytes)	2839	5073	4099	3663
Compile time (seconds)[1]	98	55	75	20[2], 11[3]

[1] Includes compile, link, and launch time.
[2] Includes time to load MacTraps library (initial compilation).
[3] Assumes MacTraps library has been loaded previously (subsequent compilation).
[4] Sample program creates modal dialog boxes and alerts. (Program was taken from Chapter 11, Huxham, Burnard, and Takatsuka, *Using the Macintosh Toolbox with C,* Sybex, 1986.)

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Insight 2

Keith Thompson

Insight brings Mac accounting to a new plateau that's more than rows and columns of numbers

Each of the numerous accounting programs now available for the Macintosh appeals to certain tastes, needs, and pocketbooks (see "The Accounting Software Buyer's Guide," *Macworld,* September 1986). Many of these packages have been aimed at small businesses with limited requirements. However, a new crop of accounting tools is now beginning to appear in the marketplace. One of these, *Insight* from Layered, is the BMW of accounting applications—an easy-to-handle, yet powerful, system consisting of several separate but integrated modules. So far, Accounts Receivable with Billing and General Ledger have been released, and Accounts Payable is due out soon.

But *Insight* isn't for everyone, since it does more than just report finances. It is intended primarily for complex organizations with several companies, divisions, departments, or profit centers. Using a series of "expert" reports, the program can draw attention to unusual financial situations and offer specific analyses of them.

JEFFERY NEWBURY

Beyond the Numbers

A sophisticated accounting program must do more than just report numbers. It should offer an extensive array of features yet remain friendly to users with limited computer expertise. Although it can easily take two to five days to learn and implement *Insight* for a particular type of business, the system requires minimal training time for day-to-day accounting procedures once it has been set up. Each module makes exemplary use of the Macintosh user interface, and all forms look like their standard manual counterparts.

The Accounts Receivable with Billing module is a typical example. You navigate the system by means of nine icons that appear along the botton of the screen, permitting you to quickly access common forms, like customer ledger cards, invoices, item cards, and deposit slips. For ready reference, you can have several forms and lists open at once, just as you would if the forms were on your desk.

When you prepare an invoice, you get an idea of how fluidly the program works. You first click on the invoice icon, which displays an invoice form (see Figure 1). *Insight* provides three invoice formats: shipping, standard, and service. Using *Insight*'s Customer Code Find window, you can look up the customer's number. When you select a number, such vital statistics as name and address are copied to the form automatically. To fill in the product order and billing part of the invoice, you follow a similar procedure. When you click on the product box on the invoice form, the Item Name Find window appears. After you select an item, *Insight* inserts the product price and description directly into the invoice. After you indicate the quantity ordered, *Insight* calculates the subtotal, adds the appropriate sales tax and freight, and totals the bill.

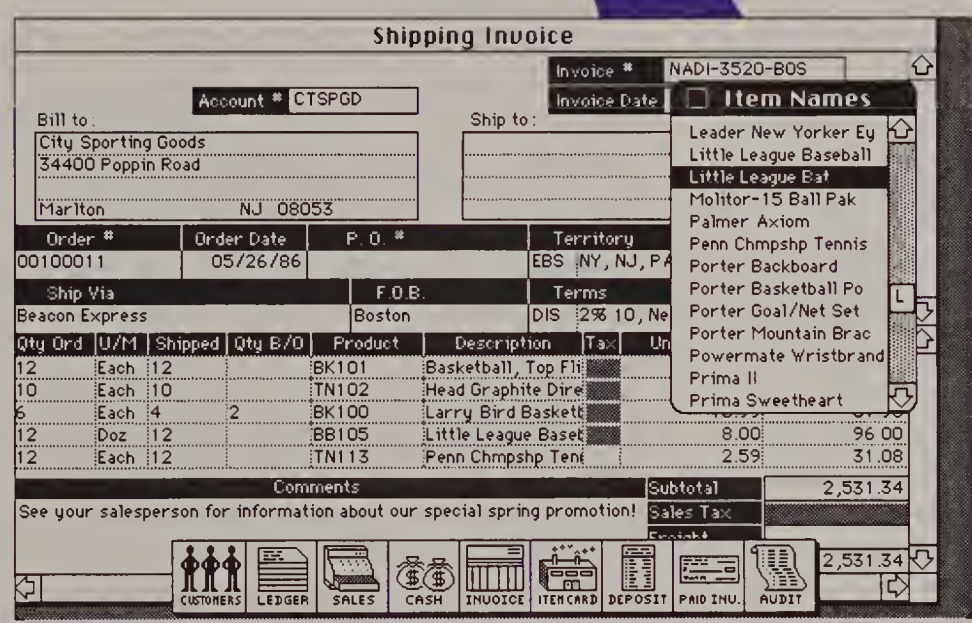

Figure 1
The nine icons at the bottom of the screen give you access to the forms, lists, and other parts of the Accounts Receivable module.

Insight automates the process still further. When you type in the number of items ordered, the shipped column shows the same number highlighted. To indicate a short shipment, you simply enter the number of items received in the shipped column—the program automatically enters the correct number in the back order column and recalculates the totals. For customer entries, you can assign a separate shipping address and even a credit limit that *Insight* constantly monitors as you fill out each invoice. If a customer goes over the limit, the program warns you in advance. And after each purchase, summary information is posted on each customer card.

Each product also has its own item card. You can enter its wholesale cost plus up to five different sales prices. As you use *Insight,* you can monitor a product's card to determine the number of units sold and the amount of profit made. In effect, item cards serve as simplified inventory systems that perform many of the tasks of a full-blown inventory module.

Later, *Insight* reviews your invoice entries, then posts the charge to the customer's record and makes a corresponding entry in a sales journal. If you are using General Ledger, *Insight* also records the transaction by debiting and crediting to the proper general ledger accounts.

Reports

An accounting system is only as good as its reporting capabilities. Every accounting system creates a standard repertoire of financial statements, like balance sheets, income statements, and aging reports. Yet most programs don't let you adapt reports to a business's special needs.

Insight's Accounts Receivable reporting capabilities are quite flexible. Each re-

port has a variety of sorting and selection options. Among the reports are detailed, summary, and exception aging reports by division, territory, sales representative, or customer. Reports are also available for month-to-date, year-to-date, or last year's sales, costs, and gross profits, by customer, product or service, territory, and sales representative.

One of *Insight*'s accounts receivable reports is a customer credit limit report, which shows customers who are over limit or those with available credit. Another report lists sales tax liability grouped according to tax jurisdictions. If you've designated more than one bank account in the setup menu, *Insight* prints deposit slips for each account.

The General Ledger provides trial balance reports and lets you build customized reports in standard reporting formats that cover almost every conceivable need. You can create an aged accounts receivable report or a sales commission report for any given period of time or territory.

Expert Reports

Insight also has a set of analytical management tools. Through a clever integration of graphs with accounts receivable data, it visually portrays an accounts receivable aging analysis; a 12-month historical analysis of accounts receivable/cash/sales, accounts receivable aging, sales, cash in, or collections; and cash receipt projections. You can click on a chart's bar to see a detailed analysis of any element of the graph.

A good example of an *Insight* expert report is the analysis aging graph. To give an overall view of a business's accounts receivable picture, *Insight* draws a bar chart displaying (by aging category) totals of outstanding amounts. You can then "look behind" each bar by clicking on it (see Figure 2). For even more specific information about a customer, you can click on the customer's name to display a full history card. You can use this expert report to monitor your company's receivables and to identify and contact customers whose accounts are delinquent.

General Ledger expert reports are limited to various ratio analyses on user-selected accounts, such as liquidity, profitability, and asset management ratios. In addition, you can view any financial statement as a pie chart and examine the underlying tabular data for any wedge of a pie chart.

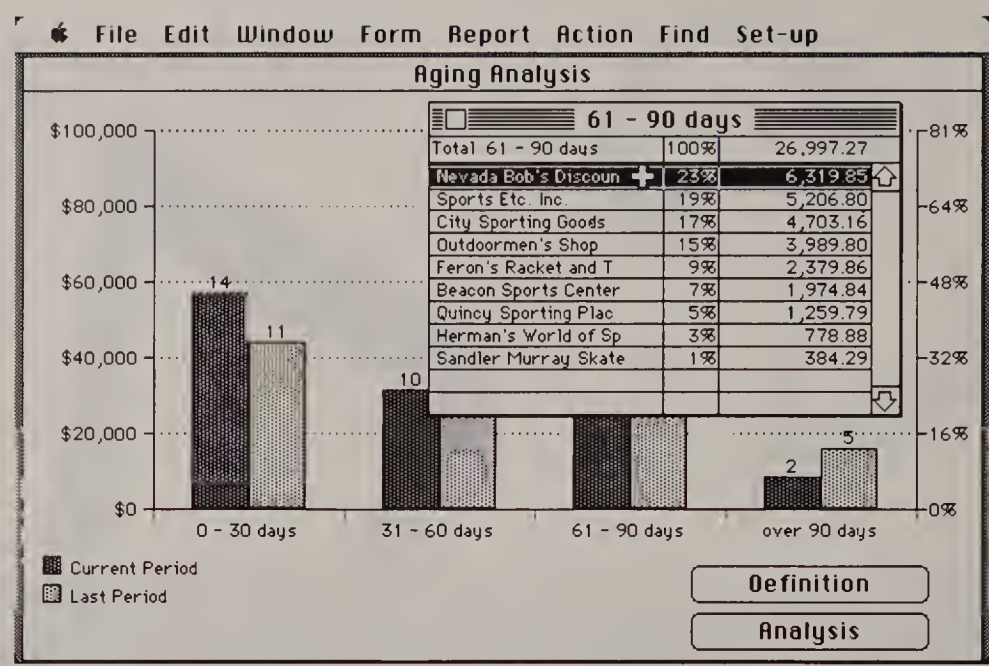

Figure 2
This expert report offers an analysis of aging by category. Clicking on a bar displays the customers and balances for that period. Clicking on a customer's name displays the corresponding ledger card.

Documentation, Support, and Security

Insight's manual sufficiently explains each of the application's features and commands. However, the tutorial doesn't always match the sample data, skips some crucial steps, and generally leaves the user guessing. If you need it, *Insight*'s comprehensive on-line help facility is always nearby in the Apple menu. The program also has excellent password security.

Regardless of how well a program is designed or documented, you will need to contact the vendor from time to time about specific problems. Layered offers three levels of customer support after the initial 30-day unlimited support period expires. You can elect On-Demand support, for which you pay by the call with a credit card; you can sign up for extended support, which offers a lower per-call fee; and finally, for those who want extensive support, Layered's Preferred Customer Program provides unlimited technical support for a set annual fee.

Totaling the Numbers

Although the first version of *Insight* doesn't leave much to be desired, Layered must address one problem in the near future: limitations in exporting files. You have the option of printing *Insight* reports to disk as text files. Then you can bring the information into *Jazz, Excel, Word,* or any other Macintosh application that accepts text files. A direct file export feature is needed to translate *Insight* data directly into an *Excel* or *Jazz* file, for example.

Also, like most accounting programs, *Insight* generates garbage if you give it large numbers. It lets you enter a 13-digit number but then throws away some of those digits. As a result, all the reports, windows, and other parts of the program report erroneous information. *Insight* also lets you change account types on accounts receivable and general ledger accounts that show current activity. This can have a variety of side effects, but the most obvious is its impact on a report's accuracy.

Another shortcoming is the inconvenience of printing expert reports. While you can print other reports directly from the screen, for expert ones you must use ⌘-Shift-3 to save the screen image as a *MacPaint* file and then use *MacPaint* to print the reports.

Finally, because it's designed to handle the accounting chores of large companies, the program should have multiuser capabilities.

On balance, though, *Insight* combines sophisticated accounting functions with a well-designed user interface. And when you consider its ability to turn routine accounting information into graphs and interpretive reports, you have the makings of an accounting system that is promoting the Macintosh as a front-runner in the accounting arena, much as desktop publishing programs established the Macintosh as the premier system in that domain. □

Keith Thompson is a writer based in Lexington, Massachusetts, and editor of several personal computer newsletters. He is also author of The Macintosh Office, *Ashton-Tate, 1986.*

Insight
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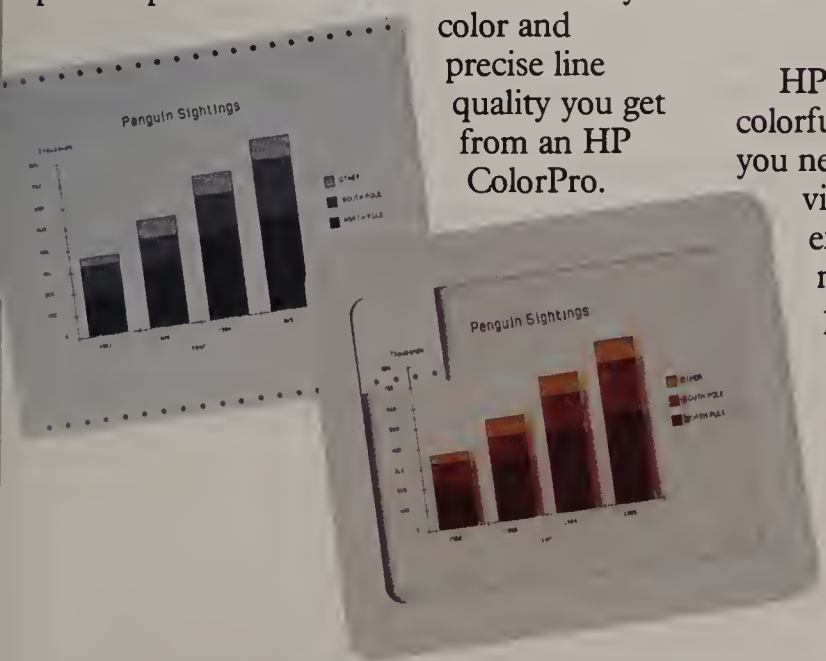

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The Ins and Outs of Interlace

Laurie Flesher

Tips and techniques for efficient database management

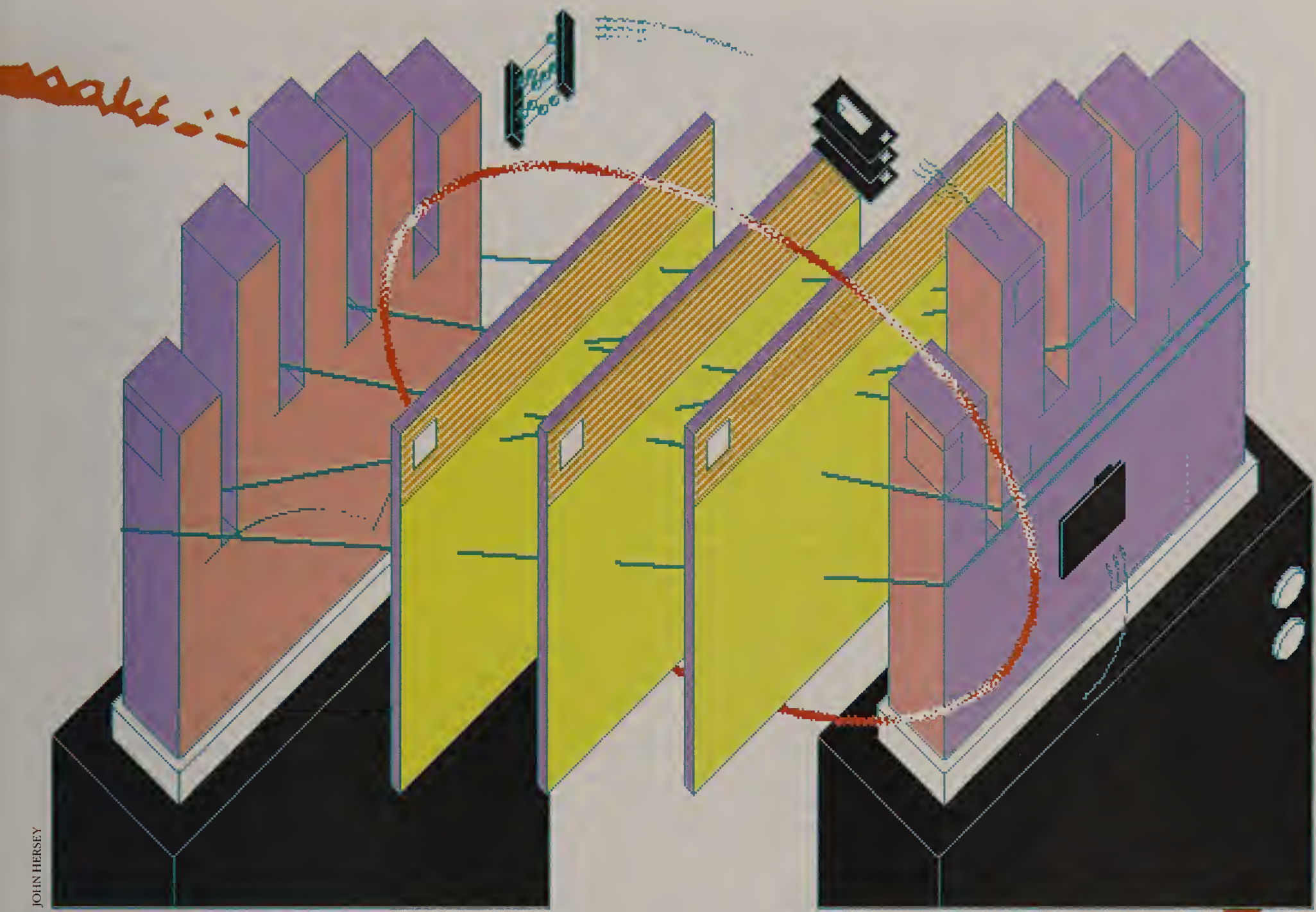
What follows is a compendium of the choicest techniques, with tips on everything from creating mailing labels to exporting data from linked files. Whether you're a beginner or an expert, chances are you'll find below what you need to weave Interlace *through the ins and outs of your own databases.*

Interlace *users have a tendency to delve deeply into the program's nooks and crannies. People use this powerful database manager for tasks ranging from the creation of address books and mailing lists to data analysis and accounting (for a review of* Interlace *see "New Relations,"* Macworld, *May 1986). We asked Laurie Flesher to pass along the best discoveries she's chronicled as technical support manager for* Interlace. *During the course of these explorations, she's gleaned many valuable tips to guide users through* Interlace*'s warp and woof.*

At press time we received word that Borland International, developer of SideKick, *had purchased Singular Software. Consequently,* Interlace *version 1.4 was renamed and is now called* Reflex for the Macintosh.

Rapid Browsing Browse through a file quickly by pressing ⌘-Shift-n to jump forward or ⌘-Shift-p to jump backward ten records at a time. These commands also work when coupled with a qualification. For example, if you issue the command along with the expression INCLUDES(FirstName,"Z"), you'll find the tenth qualifying record. If the file has fewer than ten qualifying records, the last one will be found.

Custom Export You can selectively transfer records from a database into a new database file. Use Query Build to select a specific set of records and choose Export Qualified Records from the Misc menu. Then create a template of the original file, open the template, and choose Import Records from the Misc menu.



JOHN HERSEY

Multiple Columns It's often convenient to create multiple columns in a report, for instance, when you're printing sheets of mailing labels with more than one column. First create a table-style report (call it Report1) and include all fields desired in the final report. Inside the repeating collection add a new integer field (call it ID) that has the formula PREVIOUS + 1. Create a custom report and arrange repeating collections side by side, one for each column. Give the repeating collections the formula Report1.r1 WHERE MOD(ID,n) = x. In the first column, *x* should equal 1. Give the other repeating collections the same formula, x = x + 1 until x = n-1 and in the last repeating collection, x = 0. For example, for three columns use the formulas Report1.r1 WHERE MOD(ID,3) = 1, Report1.r1 WHERE MOD(ID,3) = 2, and Report1.r1 WHERE MOD(ID,3) = 0.

Preventing Entry Errors You can prevent typing errors and other data entry errors by limiting the number of possible entries for a given field. In the Form Layout window, select a field and enter the qualification in the same way you search on a field in the Data Entry window; for example, CodeNumber = "x" OR CodeNumber = "y".

Moving Linked Fields You can change the layout of linked fields in the Data Entry window. First, select the linked fields in the Form Layout window. Then pull down the Layout menu and remove the check mark from Group Link Key Fields. You can then move and resize the fields.

Subtract the Previous Field You can subtract a field in the previous record from any field in the current record. This is useful, for instance, when you want to calculate percentage changes in a time series. Follow this procedure: Make a report and sort it in the same order as the final report. Call the report Rep1 and include a field called Index that has the formula PREVIOUS + 1. Make another report containing a repeating collection with the formula Rep1.r1 CALLED x. The subtraction formula is IF(x.Index = 1,x.f1,x.f1 – LOOKUP(f2 FROM Rep1.r1 WHERE x.Index – 1 = Index).

Grouping Objects *Interlace* version 1.4 lets you select multiple objects by shift-clicking individual objects or by completely surrounding objects with a selection rectangle by pressing the Option key and dragging the mouse. Once a group is selected, you can change the group's font, style, format, field type, alignment, and protect or unprotect group.

Then or Now? People are often confused by *Interlace*'s date and time functions, because *Interlace* assigns the date and time in two different ways, depending on the context in which they're used. In the Data Entry window, the formulas TODAY and NOW stamp the record with the date and time the record was entered. When these functions are used in a report, however, the report displays the date and time the report was calculated.

Recycled Reports Here's an efficient way to create reports that you plan to reuse repeatedly with minor modifications. Instead of entering a change in each of the report's several formulas, all of which access the same value, you might only have to change the value in one place. You can use this procedure for reports requiring only minor changes, such as new dates, as shown in the following example.

Create a label outside all repeating collections that reads "Please enter date to be evaluated." Add a date field that does not have a formula but has the name EnterDate. In the formula for the repeating collection, qualify the records by referring to the date just entered. For example, where Date is a field in the file Order, use the formula `Order WHERE Date = EnterDate`.

Interrupting Operations If you make a mistake or simply don't want to wait for the completion of a long operation, you can interrupt and cancel it by simultaneously pressing the ⌘ and period keys. This is especially valuable for time-consuming tasks such as calculating a report or searching for records within a file.

Adding Pictures Pictures can be used to embellish database forms and reports with logos, letterheads, or charge slips. After creating a picture with a graphics program like *MacDraw* or *MacPaint,* copy it to the Scrapbook or the Clipboard. To paste it into the Data Entry screen, open the database file and go to Form Layout. Click on the spot where you want the picture and paste it into place. Put the fields next to or on top of the picture.

Saving Memory
Build bigger databases by conserving space. Use this table to plan databases more efficiently.

Field Type	Memory Used
Text	2 bytes per field plus 1 byte per character of data
Number	8 bytes
Integer	4 bytes
Date	4 bytes
Time	4 bytes
Sequence	4 bytes
Logical	1 byte
Linked fields	The size of the linked key fields plus 2 bytes per link

Linked Files and HFS You can store linked files and reports on different disks and in different levels of HFS. But the program can't automatically find linked files or files used to calculate a report unless they're in the same folder as the report or are already showing in the Database Overview window. You can find files outside the report's folder by choosing Show Database File from the Overview window or by choosing Open Database File from the File menu.

Printing Field Borders Usually, the boxes that surround fields and labels are used only as a design aid for creating reports. However, you can print reports that include the boxes. First create a report without a repeating collection, like the 1040 Tax Form on the Examples disk. Then calculate the report. The boxes will print with the field's values in them.

Shoring Up the Gaps When it comes to height, not all fields are created equal. This is true of mailing labels, for instance, which vary in height, depending on the presence or absence of a company name. Unfortunately, fixed-height fields create unsightly gaps in reports. You can shore up the gaps by selecting the text field, but make it only one line high. Choose Display Format from the Format menu and select Variable Height. This option will adjust the height to fit the information entered in the field.

Updating Files You can update a file with information stored in a report or another file. This procedure is useful when you want to make global changes to the database. To update a master file from an existing file, include all the key fields in the file.

Also include all the fields being updated. If you update linked files, include only one side of the link. For example, if FileA is linked to FileB, update the link from FileA or from FileB, but not from both. *Interlace* fills in the other side of the link.

If a record with the same key already exists, the key fields don't change; only nonkey fields are modified. If a record with the key does not exist, *Interlace* enters a new record. Caution: if a sequence field is being used as the key, it is easy to accidentally overwrite entered records. Make sure the keys are unique by starting with a number larger than any entered in the master file.

Odd Paper Sizes When you print, you may want to use a paper size that is unavailable in the Page Setup dialog box. *Interlace* version 1.4 lets you use the following technique to print on nonstandard paper sizes, such as mailing labels. Create a repeating collection that's slightly smaller than the label size you want to use. Give the repeating collection the appropriate

formula and place the desired fields inside the repeating collection. Put a Page Break After icon inside the repeating collection at the bottom. Choose Paper Sizes from the File menu and enter the label size and description. Choose Page Setup from the File menu and select the new page size. Calculate the report and print the labels.

Exporting Linked Files Sometimes you may want to export all the information in a report, including data stored in linked files. To do this, create a report that accesses all fields within one repeating collection. (This repeating collection can be nested inside others.) The formula for the repeating collection should be FileName.LinkName. All fields in the file and in the linked file are available.

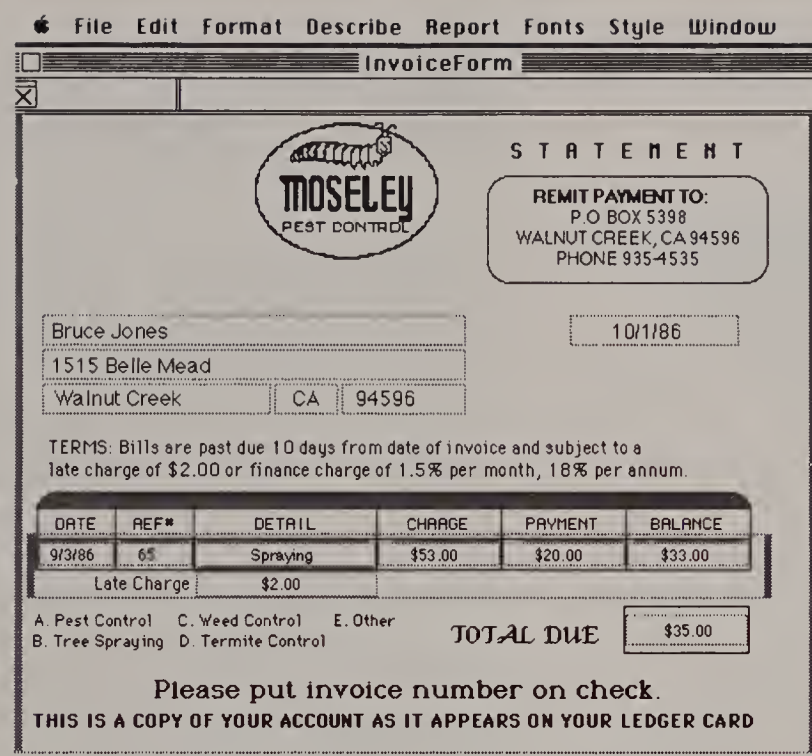
Duplicate, Don't Redraw Instead of wasting time redrawing fields, repeating collections, or labels in forms and reports, simply duplicate them. Select the object or group of objects you want to reproduce and choose Duplicate from the Edit menu. The new duplicated fields and labels retain the originals' font, size, style, and type.

Accurate Positioning The best way to line up objects in a form is to choose the Align to Grid option. This ensures that fields, repeating collections, and labels line up from the outset on a grid that the program creates to avoid random placement. In version 1.4 objects align to the closest grid point. The grid has nine dots per inch.

Big Backups Occasionally, you may want to back up a file that is larger than the capacity of a floppy disk. You can use a backup program, as long as it backs up both the resource and data forks of files. If you don't have a backup program, you can transfer the file in portions by qualifying the export operation. For example, export only those records in which the field LastName starts with *A* to *M*. Then perform a second data transfer in which LastName starts with *N* to *Z*. Export all data in text format.

Reforming Corrupt Files When you link files, it's important to back up all linked files at once. However, people often forget and consequently mix old and new versions of the linked files. Sometimes you can correct this with the following procedure: Create a new template identical to the original. Import all the data from the inconsistent files into the new template, importing into only one side of the links.

If that doesn't work, create a new report for each file. For the repeating collection use the formula FileName CALLED x. Include all the file's key fields and add a logical field for each link in the file, using the formula NOT EXISTS(LinkNameA WHERE COUNT(LinkNameB WHERE KeyA = x.KeyA) < > 1). LinkNameA and KeyA are in File A, and LinkNameB is in File B. When you calculate the report, all those records that have inconsistent links will create a FALSE in the logical field. Note all corrupt records and open the database file. Turn off



Pictures in Forms *You can add pictures to data entry screens by pasting them from the Clipboard. When pasting pictures into reports, surround a picture with a repeating collection if you want it to appear in each record. If you want the picture to appear only once, leave part of it outside the repeating collection.*

Check Links in the Misc menu and move to the problematic records. Check each link by selecting it, and methodically follow the link by choosing Show Linked Record from the Database menu. Perform this operation in both directions. When you find the inconsistent link, change both sides of the link so that they are identical to the key fields in the other files. Make sure all records are consistent by activating Check Links and rerunning the test report. It's important to turn Check Links on again before entering any new records.

Calling for Comparison On occasion, it's useful to compare two fields in different files that have the same name. For example, one file contains a field called Date that stores a bill date. The linked file contains a field called Date that stores a ship date. Use the CALLED function to find only those records with a shared field name in which the ship date in one field is the same as the bill date in the other field. Simply give the repeating collection the formula FileName CALLED x WHERE EXISTS(LinkName WHERE x.Date = Date) to compare the two fields.

Inserting Line Breaks You can insert a line break in a field (instead of waiting for the line to wrap around) by typing Shift-Return. □

Laurie Flesher is technical support manager for Reflex for the Macintosh *at Borland International.*

Reflex for the Macintosh, version 1.0
Borland International, Inc.
4585 Scotts Valley Dr.
Scotts Valley, CA 95066
408/438-8400
List price: $99.95

Keys to the Future

Nanci Hamilton Reel and Christopher Osburn

How to bring your state-of-the-art keyboard out of the nineteenth century

The Macintosh's QWERTY keyboard was laid out 113 years ago, when clunky mechanical typewriters couldn't keep up with typists' fingers. With the arrival of smoother mechanics, electric typewriters, and word processing on computers, the logic of the more efficient Dvorak keyboard becomes difficult to resist.

The standard keyboard, nicknamed QWERTY after the first six letters in the top row of letters, was designed in 1873 by Christopher Latham Sholes. With his early machines, the mechanical type bars didn't always fall back into place in time for the next keystroke and so tended to jam. Sholes solved this problem by distributing the most commonly used letters all over the keyboard, making sure that frequent combinations (such as *ed*) had to be struck by the same finger. Sholes designed the QWERTY keyboard to slow down typing.

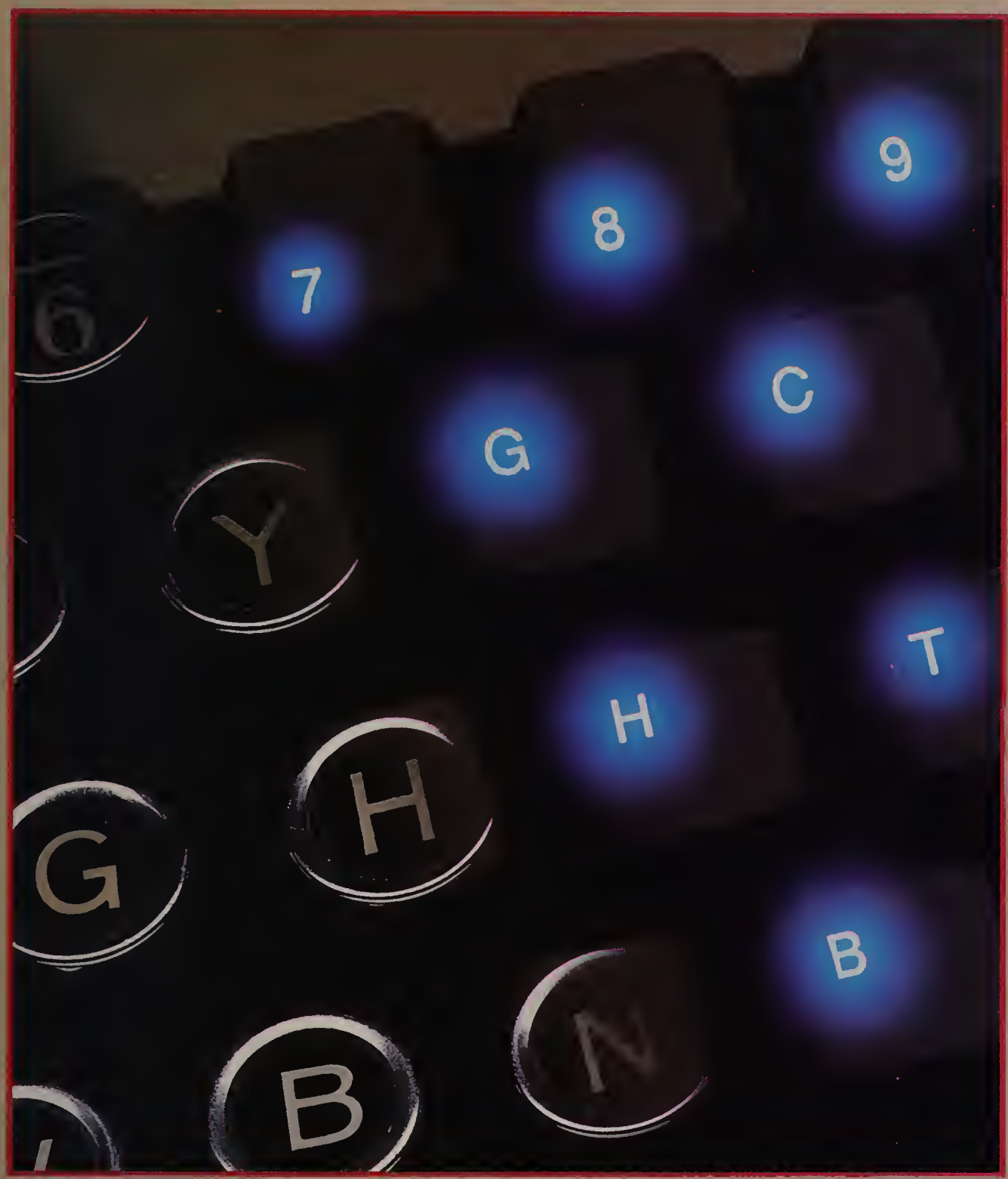
Dvorak's Better Idea

In the 1930s August Dvorak, a Washington State University professor, received two Carnegie Corporation grants to study the nature of typewriting. A disciple of time-and-motion study experts Lillian and Frank Gilbreth, Dvorak noticed that the average person typing on a QWERTY keyboard uses the left hand more than the right and that fingers frequently have to jump up and down over the home row (the second row of letters). His judgment of the QWERTY keyboard? "If the letters and characters . . . were drawn from a hat and placed by pure chance," the resulting layout would make more sense than the one designed by Sholes.

Dvorak designed a keyboard with the Gilbreths' efficiency principles in mind: simple motions, short movements, and rhythmic sequences. All five vowels and the four most commonly used consonants are on the home row, right under the fingertips. With these letters—*A, O, E, U, I, D, H, T, N, S*—a typist can produce approximately 4000 common English words, compared with about 100 on the QWERTY home row. When you type on a Dvorak keyboard, about 70 percent of the keystrokes fall in the home row, compared with about 32 percent on a QWERTY.

The Dvorak keyboard allows more balanced typing. Because the vowels are under the left hand and the most frequently used consonants are under the right hand, there is a rhythmic shifting from hand to hand. In addition, the Dvorak keyboard favors the right-handed majority. A Dvorak typist uses the right hand about 56 percent of the time, while the QWERTY typist must use the left hand about 57 percent of the time.

The QWERTY keyboard continues to dominate because of resistance from QWERTY-trained typists and the cost of exchanging a mechanical QWERTY machine for a Dvorak device. However, the easy programmability of personal computers eliminates much of the expense and trauma of converting to Dvorak. In addition, software typing tutors make retrain-



DAVID BISHOP

ing less painful and allow first-time typists to come up to speed faster than they could with a QWERTY device. According to Virginia Russell, president of the Dvorak International Foundation, "It takes a nontypist about 18 hours to learn to type at the rate of 40 words per minute with Dvorak. But it takes the same person about four times as long in the QWERTY format.

The keyboard conversion described here departs slightly from the standard Dvorak layout. ANSI fails to specify a location for the brace keys ({ and }) and places both brackets ([and]) on the same key near the upper-right corner of the keyboard. The Macintosh has a pair of keys, one with an opening brace and an opening bracket, the other with a closing brace and a closing bracket. The modified Dvorak keyboard layout places these keys side by side at the extreme right of the top row and moves the equal sign (=) and plus sign (+) key down one row (see Figure 1). The modification eliminates the need to relabel the key tops, if they have been physically rearranged.

Dvorak laid out a keyboard with efficiency in mind: short motions and rhythmic sequences.

Quitting QWERTY, Doing Dvorak

To convert the Mac's QWERTY keyboard to Dvorak, you change the software by altering the System file and change the hardware by relabeling or rearranging the keys.

To create a Dvorak System file, you need a program editor. The two most common are *MacTools* (from Central Point Software) and *Fedit* (by John Mitchell of MacMaster Systems). For this tutorial, I used *MacTools*.

To get started, place the disk you want to convert to a Dvorak disk in one drive and the program editor disk in the other. Make the changes on a copy of the system disk, not the original disk provided with the computer.

Double-click on the editor icon. For each disk, the editor displays a window listing the files on the disk. Click the title bar of the Dvorak disk's window. From the list displayed in the window, select the System file. Before you continue, check to be sure the System file is unprotected and unlocked.

Choose ViewEdit from the File menu. A window containing the file header information appears on screen. The horizontal scroll bar at the bottom of this editing window allows you to scroll through the data

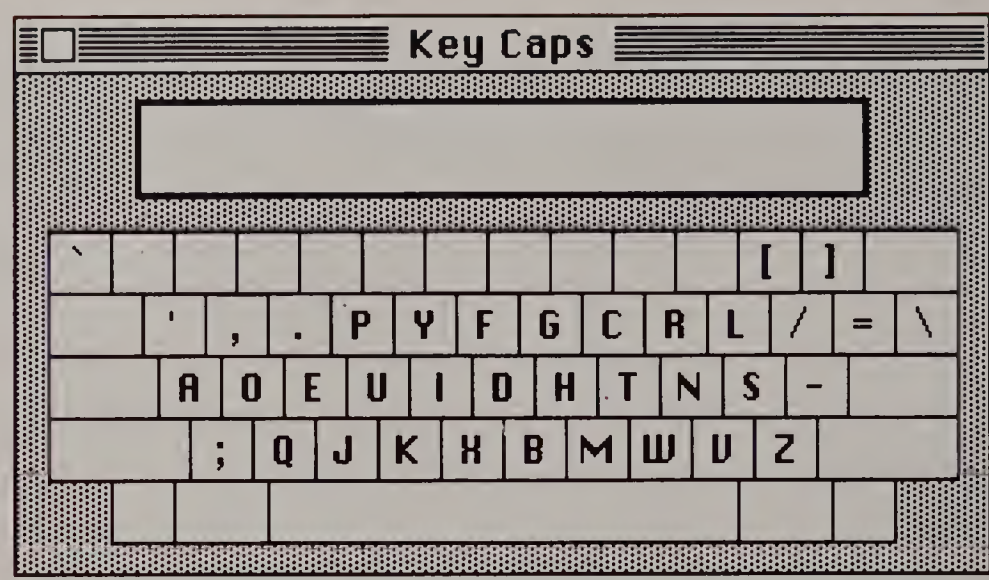
blocks in that file. Each block is numbered and has two parts (A and B); each windowful displays information on one part.

Next, pull down the Misc menu. Make sure that the Resource Fork option is checked (and the Data Fork option is not).

You could use the scroll bar to reach block 102, part A, but you save yourself some mouse clicks by selecting Read Specific Block on the Misc menu or by typing ⌘-B. In a moment, a Get Block dialog box appears. Type 102 and click the OK button (or press the Return key).

The code for the keyboard map starts at address 0013, which is in the row beginning with 0010 in the leftmost column. The character stored at that location is lowercase *a*. The rightmost column in the window contains the ASCII characters stored in the block, while the eight four-digit columns in between contain the equivalent hexadecimal code. Don't fret: you don't have to know hex code to make this Dvorak modification. You only need to type a new sequence of ASCII characters, which are ordinary letters and numbers.

Move the cursor over the lowercase *a* in the rightmost column, in the row starting with 0010, and click the mouse to select the character.



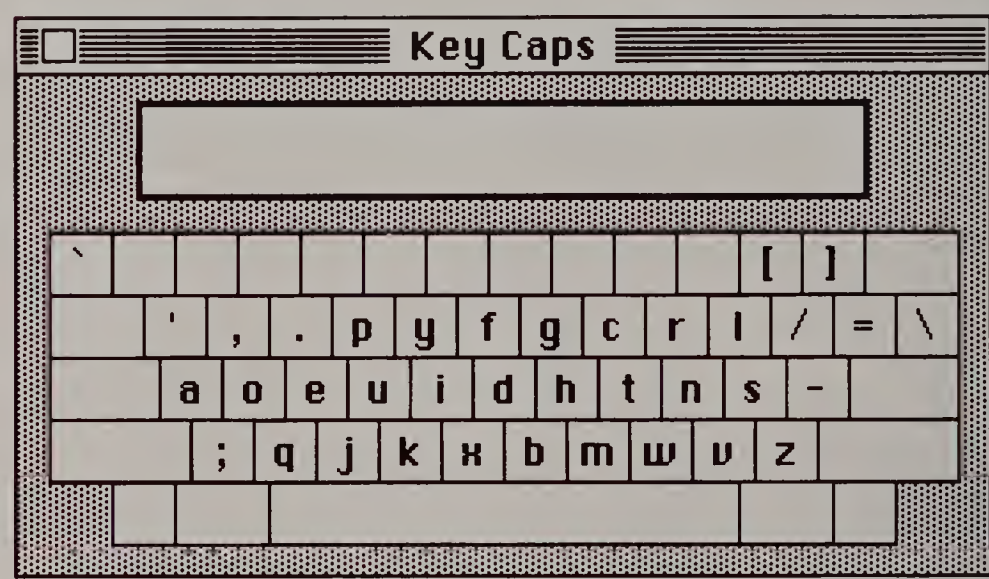


Figure 1
The Dvorak keyboard layout that results from altering the System file as described. The layout differs from the standard Dvorak keyboard only in the locations of three keys in the upper right: the brackets, the braces, and the equal and plus signs.

Mapping the New World

You are ready to enter the new keyboard layout. Refer to "QWERTY/Dvorak Conversion" and type in the ASCII characters listed in the Dvorak column to replace the QWERTY sequence.

There is one slightly tricky area: some characters aren't displayed on screen. Luckily, the Dvorak keyboard doesn't change the locations of these keys. When the Dvorak column lists no character, skip over the blank: move the hollow box to the next location, and click once to highlight that character. Then continue typing the new sequence. Don't press the space bar or the Return key to skip over the blank. Even though you won't see a change under the ASCII column in the window, the Mac interprets the input as a keyboard change and changes the hexadecimal codes.

When you get to the end of block 102, save the changes you have made by selecting Write Block from the Misc menu.

Scroll to the next block by clicking anywhere to the right of the scroll box. Position the cursor on the first character in the top row of the ASCII column, click once, and wait till it is highlighted. Then continue entering the new keyboard sequence.

If you make a mistake, select Undo from the Misc menu. The command undoes all the keyboard entries since you last saved, which you can only do a block at a time, so you have to start again from the beginning of the ASCII sequence or from the start of the current block.

When you are done, save your changes on disk by again selecting Write Block from the Misc menu.

To complete the conversion to a Dvorak Mac, quit the program editor and shut down the Macintosh. Restart using your Dvorak disk. Take a look at the Key Caps display, which is in Dvorak format. The Option-key characters have not been rearranged because their keyboard position is arbitrary anyway. If you want to reassign certain Option-key characters—for example, to keep the tilde (˜) with the *N* and the umlaut (¨) with the *U*—you can do so with *FONTastic* from Altsys (see "The Mac Font Shuffle," *Macworld,* December 1985). At any rate, refer to Key Caps if you have trouble finding a character you need.

Keyboard shortcuts remain the same on the Dvorak keyboard. If you need to type ⌘-Z, for example, you still type ⌘-Z, even though the *Z* is in a different place on the keyboard.

As long as the Dvorak disk is the startup disk, the Dvorak keyboard is in effect. If you want to restore the QWERTY keyboard layout, simply restart the Mac with an unaltered System disk.

Changing the Keys Themselves

Next, the keys on the keyboard must be rearranged or relabeled to match the new System file. Physically rearranging the keys is cost-effective and requires no new materials, but it is somewhat tedious and

(continues)

QWERTY/Dvorak Conversion

Address Block 102	QWERTY	Dvorak	Address Block 102	QWERTY	Dvorak	Address Block 102	QWERTY	Dvorak
0013	a	a	002F	8	8	004B	F	U
0014	s	o	0030	0	0	004C	H	D
0015	d	e	0031	]	=	004D	G	I
0016	f	u	0032	o	r	004E	Z	:
0017	h	d	0033	u	g	004F	X	Q
0018	g	i	0034	[	/	0050	C	J
0019	z	;	0035	i	c	0051	V	K
001A	x	q	0036	p	l	0052	(null)	(null)
001B	c	j	0037	(Return)	(Return)	0053	B	X
001C	v	k	0038	l	n	0054	Q	"
001D	(null)	(null)	0039	j	h	0055	W	<
001E	b	x	003A	'	-	0056	E	>
001F	q	'	003B	k	t	0057	R	P
0020	w	,	003C	;	s	0058	Y	F
0021	e	.	003D	\	\	0059	T	Y
0022	r	p	003E	,	w	005A	!	!
0023	y	f	003F	/	z	005B	@	@
0024	t	y	0040	n	b	005C	#	#
0025	1	1	0041	m	m	005D	$	$
0026	2	2	0042	.	v	005E	^	^
0027	3	3	0043	(Tab)	(Tab)	005F	%	%
0028	4	4	0044	(space)	(space)	0060	+	}
0029	6	6	0045	`	`	0061	(	(
002A	5	5	0046	(Backspace)	(Backspace)	0062	&	&
002B	=	]	0047	(Enter)	(Enter)	0063	_	{
002C	9	9	0048	A	A	0064	*	*
002D	7	7	0049	S	O	0065	)	)
002E	-	[	004A	D	E	0066	}	+

Address Block 102	QWERTY	Dvorak	Address Block 102	QWERTY	Dvorak	Address Block 102	QWERTY	Dvorak
0067	O	R	0080	F	U	0099	8	8
0068	U	G	0081	H	D	009A	0	0
0069	{	?	0082	G	I	009B	]	=
006A	I	C	0083	Z	;	009C	O	R
006B	P	L	0084	X	Q	009D	U	G
006C	(Return)	(Return)	0085	C	J	009E	[	/
006D	L	N	0086	V	K	009F	|	C
006E	J	H	0087	(null)	(null)	00A1	P	L
006F	"	_	0088	B	X	00A2	(Return)	(Return)
0070	K	T	0089	Q	'	00A3	L	N
0071	:	S	008A	W	,	00A4	J	H
0072	|	|	008B	E	.	00A5	'	-
0073	<	W	008C	R	P	00A6	K	T
0074	?	Z	008D	Y	F	00A7	;	S
0075	N	B	008E	T	Y	00A8	\	\
0076	M	M	008F	1	1	00A9	,	W
0077	>	V	0090	2	2	00AA	/	Z
0078	(Tab)	(Tab)	0091	3	3	00AB	N	B
0079	(space)	(space)	0092	4	4	00AC	M	M
007A	~	~	0093	6	6	00AD	.	V
007B	(Backspace)	(Backspace)	0094	5	5	00AE	(Tab)	(Tab)
007C	(Enter)	(Enter)	0095	=	]	00AF	(space)	(space)
007D	A	A	0096	9	9	00B0	`	`
007E	S	O	0097	7	7	00B1	(Backspace)	(Backspace)
007F	D	E	0098	-	[	00B2	(Enter)	(Enter)

All numbers apply to System File version 3.2

QWERTY/Dvorak Conversion

Type the characters under the Dvorak column to replace the characters in the QWERTY column already in the System file. Address codes that end in zero mark the start of a new row in the data blocks displayed in the ViewEdit window. Remember to use the cursor to skip over addresses that contain no ASCII character, such as those containing returns and tabs.

Keys to Quicker Typing

■ *Resource/Font Editors*

Copy II Mac
Central Point Software
9700 S.W. Capitol Hwy. #100
Portland, OR 97219
503/244-5782
List price: $39.95 plus $3 shipping, includes MacTools
Program editor

Fedit Plus
MacMaster Systems
939 E. El Camino Real #122
Sunnyvale, CA 94087
408/773-9834
List price: $40
Program editor

Fontastic
Altsys Corp.
720 Ave. F #108
Plano, TX 75074
214/424-4888
List price: $49.95
Font editor

■ *Key Top Overlays*

Plastic overlays for Dvorak and modified Dvorak keyboard layouts. Available with Dvorak in large black letters and QWERTY in small red letters or with Dvorak in large red letters with QWERTY in small black letters.

Hooleon Corp.
Dept. MW
P.O. Box 201
Cornville, AZ 86325
602/634-7515
List price: $26.95 (quantity discounts available)

Switch to Dvorak
P.O. Box 162
Cape Canaveral, FL 32920
305/784-1541
List price: $25

■ *Keyboard Conversion*

MacKeymeleon
Avenue Software Inc.
1173 Charest Blvd. #250
Québec City, Québec
G1N 2C9 Canada
418/682-3088
List price: $49.95
Keyboard customizer

MacQwerty
Paragon Courseware
4954 Sun Valley Rd.
Del Mar, CA 92014
619/481-1477
List price: $35
A program that reconfigures the Macintosh keyboard to the Dvorak layout or allows you to program in a custom layout

■ *Typing Tutors*

MacType
Palantir Software
12777 Jones Rd. #100
Houston, TX 77070
800/368-3797, 713/955-8880
List price: $49.95
Typing tutor with built-in Dvorak speed and accuracy exercises

MasterType
Scarborough Systems
55 S. Broadway
Tarrytown, NY 10591
914/332-4545
List price: $49.95
Typing tutor that allows users to develop Dvorak layout typing exercises

requires manual dexterity. Since the Macintosh has a sculpted keyboard, moving the keys results in a slightly irregular keyboard.

To rearrange the keys, carefully pry the key tops free and then press them into their new positions. To remove the key tops, insert a flat-bladed screwdriver under them and gently pry them upwards. Then gently press them into their new positions.

You can relabel the keys instead of repositioning them. Some key top labels show both Dvorak and QWERTY layouts and match the color and texture of the existing keys. Certain programs, such as *MacTerminal,* use their own keyboard map; you may need to see both layouts on your keyboard. Relabeling is easy to do and can result in an attractive keyboard, but the labels may be difficult to affix or remove.

Learning Dvorak Typing

Programs are available to teach you to type on a Dvorak Mac. *MacType* from Palantir includes exercises for the Dvorak layout that allow you to develop speed and accuracy and monitor your progress. *MasterType* from Scarborough Systems has no exercises for the Dvorak layout but allows you to build your own.

One hundred thirteen years is a long time for a keyboard design to endure unchanged, especially one that was intended to slow down typing rather than speed it up. □

Nanci Hamilton Reel is the author of Macintosh Notebook: Multiplan *(Prentice-Hall, 1985). Christopher Osburn is a systems analyst and engineer. Both are based in Portland, Oregon.*

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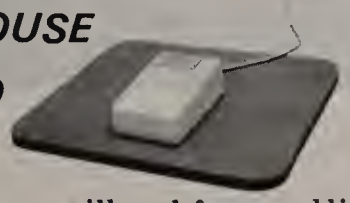
Gallon of Black Ink	$75.00
Color Ink Kits (2 Oz. ink, uninked roller, roller cover)	$ 8.00
Uninked Roller w/Cover	$ 3.50
ImageWriter Ribbon Cartridge (box of 2 uninked ribbons)	$10.00
ImageWriter Ribbon Cartridge (box of 2 inked ribbons)	$12.00
ImageWriter II Multi-Color Ribbon	Call
Print Head Cleaning Kit	$ 9.95
Re-Inker Shut-Off Timer (for high volume users)	$24.00
ImageWriter Silence Pad	$11.25

MOUSE PAD



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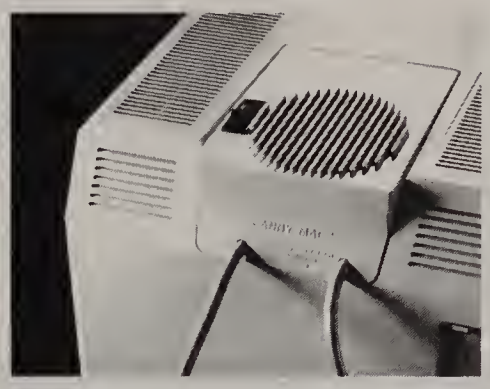
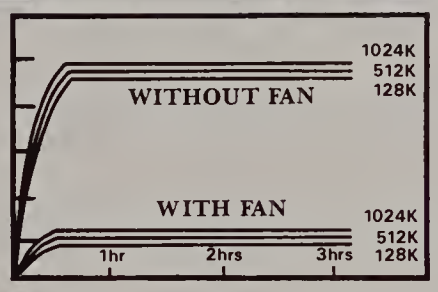
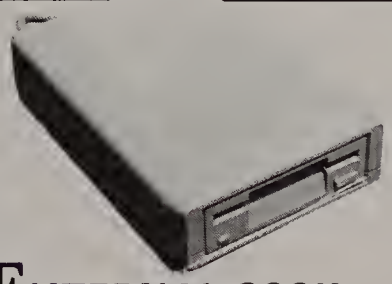




Temperature measured inside top left and right side of MAC with LM35 temperature sensor. 75° average ambient air temperature during test.



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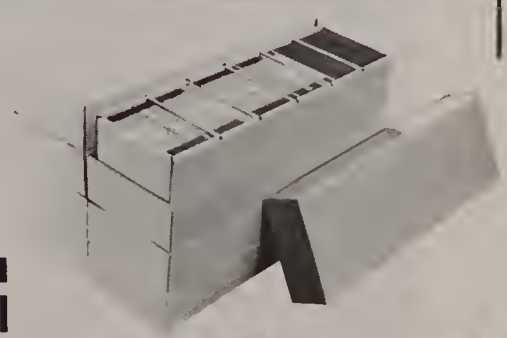

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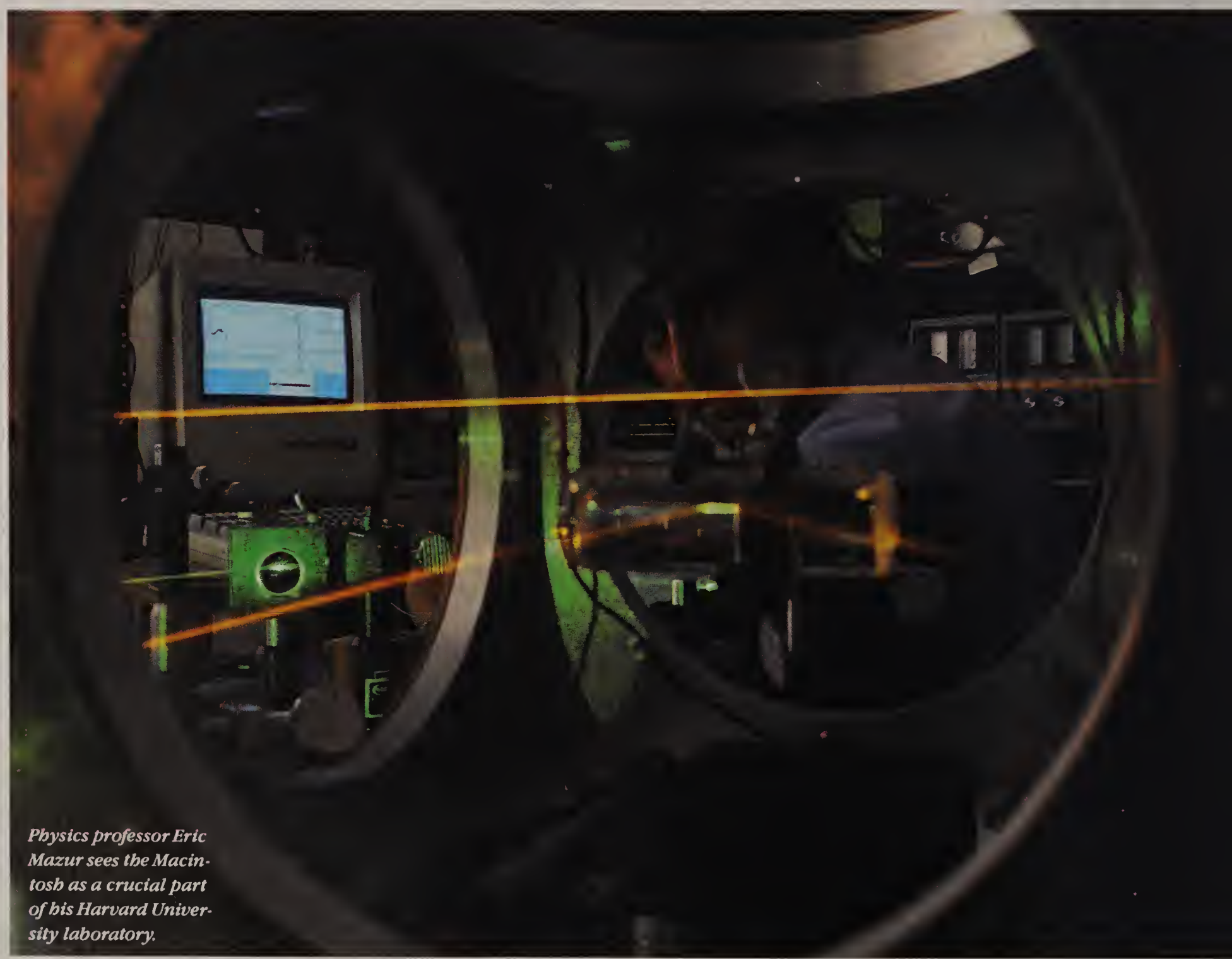
The Labtop Macintosh

Dan McNeill and Paul Freiberger



Physics professor Eric Mazur sees the Macintosh as a crucial part of his Harvard University laboratory.

PHOTOGRAPHS BY LEE YOUNGBLOOD

At the University of Utah, physicists are using the Macintosh to assess the effects of atomic bomb testing. They extract quartz from bricks, heat it, and record the colors that appear at different temperatures. This data, indicating the level of irradiation, then goes into the Macintosh for analysis.

At the Lawrence Laboratory in Berkeley, California, biochemists use the Mac to study the 3-D structure of molecules that transport ions across cell membranes. Studying these molecules can enhance scientists' understanding of how cells become cancerous, as well as help in designing new drugs.

At the Oregon Primate Research Center, researchers are using the Macintosh to develop a contraceptive vaccine, a simple injection that would render a person infertile for an extended period.

The Macintosh now seems poised to invade the scientific–or *labtop*–market. While the IBM PC still rules this turf, its footing may be a little wobbly. Many scientists have Macs at home and are just waiting for an excuse to usher the Mac into the lab.

Although many researchers write their own programs for the Mac, a paucity of software has so far hindered full development of the labtop Macintosh. But now comes a new wave of products that can make the Mac significantly more appealing to laboratory scientists.

Biology

One of the more specialized programs is *DNA Inspector II,* developed by Bob Gross, a biology professor at Dartmouth College. "I got very frustrated with the other programs available," he says. "I'd turn on a program and have nothing but a colon flashing in the upper-left corner of the screen." So Gross bought a Macintosh and wrote *DNA Inspector II,* a tack few researchers are likely to take.

DNA Inspector II facilitates research on DNA molecules in numerous ways. First, it aids in proofreading. No one can type in a string of, say, 30,000 combinations of nucleotides without making a mistake. (The DNA molecule codes information through patterns formed by four nucleotides: adenine (A), guanine (G), cytosine (C), and thymine (T). Part of a DNA strand might look like this: TGAGCAAATGGGTG.) The software offers two solutions to this problem. It lets you type in the list twice and then checks for discrepancies. Or, since it comes with *SmoothTalker,* it can read the list back to you.

The program also performs DNA sequencing, that is, mapping out the order of nucleotides in DNA molecules. To learn the order of nucleotides, researchers break the DNA into fragments. A string of, say, 3000 nucleotide combinations is cut into smaller, random chunks, whose sequence can be identified. The program then analyzes these pieces for overlaps and lets you reassemble the whole.

Many scientists with Macs at home are just waiting for an excuse to usher them into the lab.

DNA Inspector II conducts what's called *homology matrix analysis,* essentially a point-by-point comparison of two codes. This kind of analysis has revealed, for instance, that some cancer genes are simply normal genes programmed to make certain types of cells, but they're activated at the wrong time. Likewise, this technique is useful for comparing genes of different organisms–like horses, chimps, and man–and for assessing lines of descent.

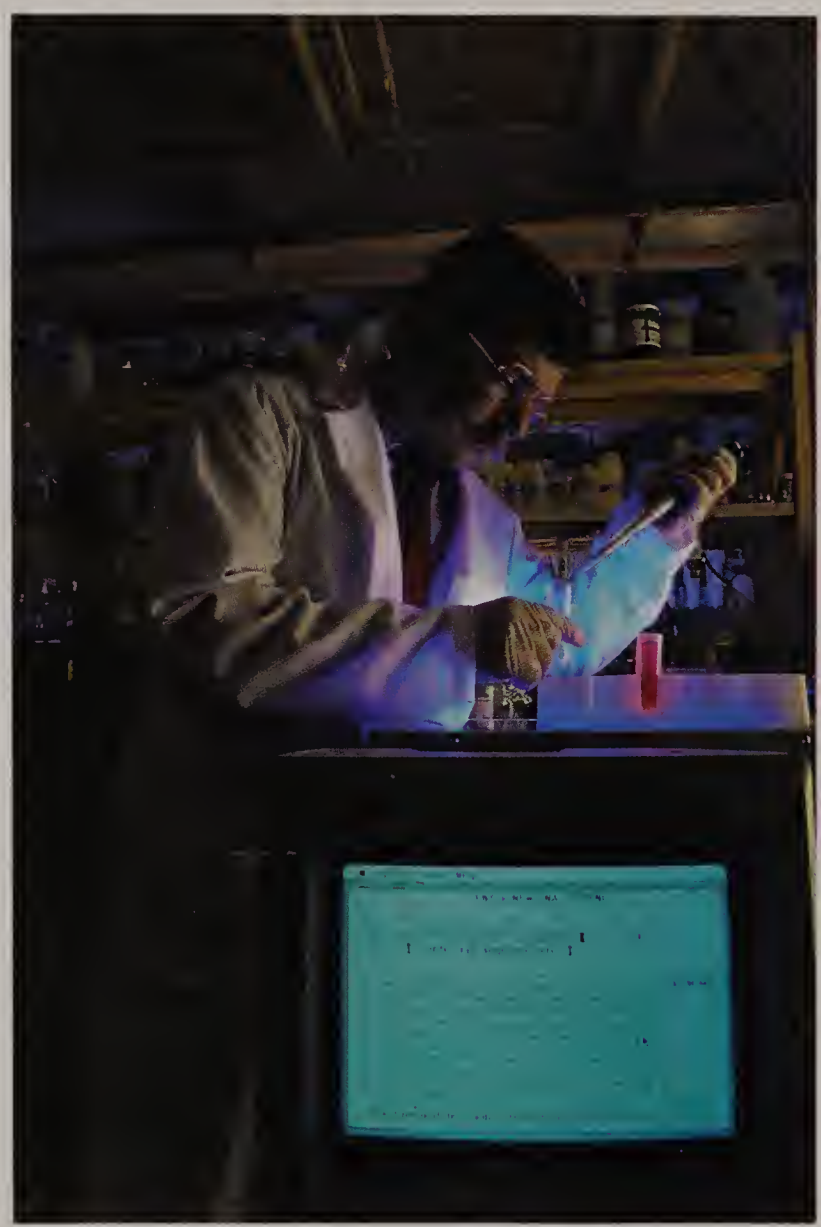
DNA Inspector II also lets you construct recombinant DNA molecules on screen. Recombinant DNA uses restriction enzymes, which cut a DNA string wherever they recognize a specific sequence. The program has a table of 100 such enzymes, plus a database of 365 others that can be entered into the table. You can also add your own. Armed with these handy scissors, you can cut and splice DNA molecules and then analyze the results.

The software has many other features, but perhaps its most unusual one resulted from an article aimed at DNA researchers called "Playing the Song of Life," which Gross saw in the prestigious British jour-

nal *Nature*. Rather than examine long strings of letters to recognize repeated DNA patterns, the article suggested, investigators should assign them notes on the musical scale and play the result. "I put that in the program at first almost as a joke," he recalls. "But then I tried it. It really works. If you play the DNA, you can pick up patterns up to 50, 60, 70 notes long with your ear alone."

Chemistry

Articles in chemistry journals are often profusely illustrated with molecular structures. To produce these drawings, chemists must normally hand-sketch the molecules, then send them to a draftsperson. *ChemDraw,* developed by chemist Stewart Rubenstein, circumvents this problem. It allows easy creation of structural formulas for articles, slides, reports, papers, theses, and other presentations. *ChemDraw* illustrations have already appeared in such periodicals as the *Journal of the American Chemistry Society,* and the program is attracting much interest among professionals.



Bob Gross, a Dartmouth biology professor, created DNA Inspector II *for the Macintosh. The program performs several tasks that aid scientists in researching DNA molecules.*

The software is similar to *MacDraw,* except that it's specifically oriented to chemists. It has a palette of icons on the left edge of the screen. Click the single-line icon, and you can draw normal bonds between atoms. Click the cyclohexane icon, and you instantly create a cyclohexane ring. Click the acyclic-chain icon, and a string of bonds appears in a zigzag arrangement. The program comes with a text capacity for labeling and adding nonhydrocarbon atoms to molecules. It also offers arrows (normal, bold, curved, hollow, and retrosynthetic) and circles, which can be used to highlight or indicate aromaticity.

Rubenstein foresees that when the 68881 floating-point coprocessor becomes readily available, commercial software will do 3-D molecular modeling, a boon to scientists currently grappling with balls and straws. "But already," he says, "*ChemDraw* is being used as an excuse by many people to buy Macs." Rubenstein cites Eli Lilly and Du Pont as companies that have purchased Macintoshes especially to use his product.

MacChemistry is another program geared to chemists' needs, or at least to chemistry students' needs. *MacChemistry* simulates titration experiments and offers templates for over 300 graphic images—such as crystal lattices, stoppers, and other apparatus—useful for embellishing reports. In addition, it has a periodic table from which you can get information on any element by clicking on its square. You can also use the program's "electronic storage tray" for stashing and indexing graphic images.

Automating Experiments

The Macintosh is also being used to automate experiments, performing data acquisition and instrument control.

Data acquisition involves feeding experimental information—such as data on heat, sound, or light—directly into the computer. Suppose you wanted to take temperature readings throughout the day. You could use a thermometer, check it visually, and write down the results. But that would be a tedious, time-consuming approach. A better alternative would be to use a thermocouple, which converts temperature into voltage. The voltage can then run a pen-and-ink recorder or a meter.

But you still haven't gotten the data into the computer, where it can be stored and manipulated. Voltage is analog, and the Mac requires digital input. However, with an analog-to-digital converter, other control hardware, and the right software, you can enter the data into the computer and display it on screen automatically.

Of course, you're hardly restricted to temperature. A microphone turns sound into voltage. A strain gauge turns structural deformation into voltage. If you wanted a computer display of a frog's heartbeat, for instance, you would simply attach the frog to an EKG and funnel the signals through peripheral hardware and into the Mac, which would show the pulse as it occurred and store the data. Data acquisition provides a quick way to record various sensory information.

And once the Macintosh has that information, instrument control takes over: the Mac can assess the data and send related commands to other devices. Instrument control lets you provide repeated stimuli to many experimental animals at once, test devices right off the production line, and perform similar tasks.

'We decided to provide the next-generation solution for people who want to automate testing.'

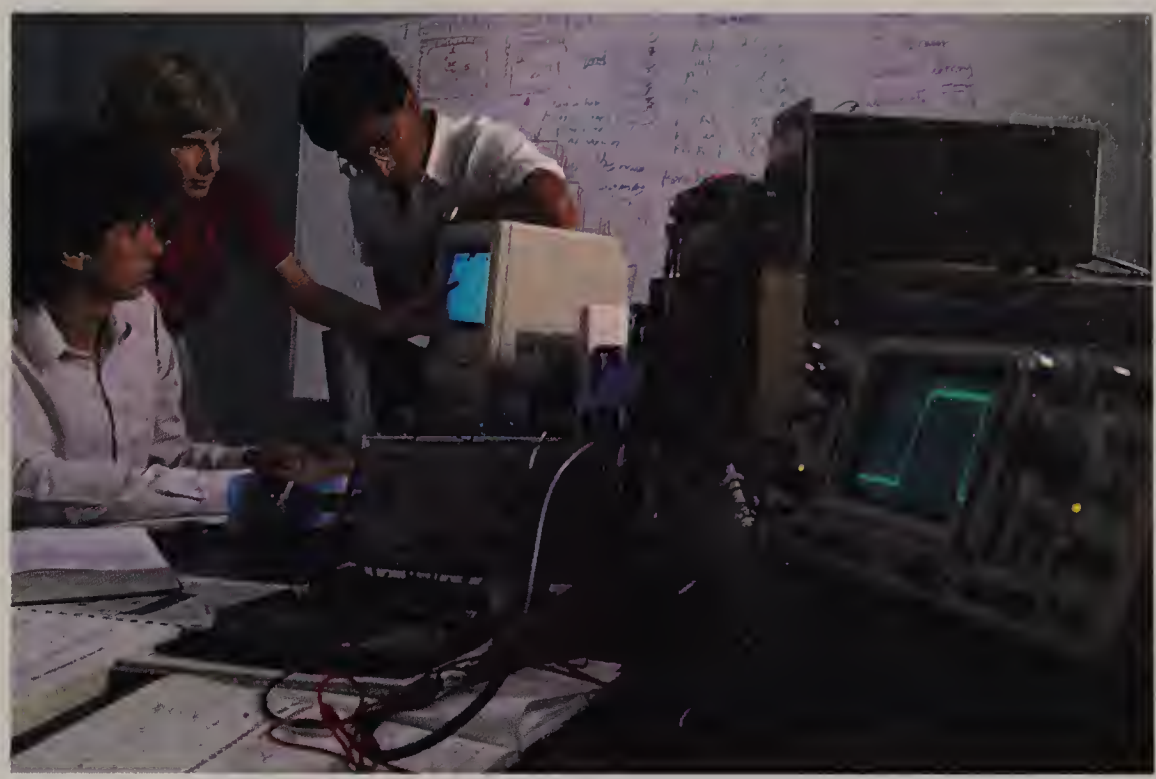
A computer can obtain data from instrumentation in one of three ways. Most personal computers, such as the IBM PC and the Apple II, can accept data acquisition boards that provide a communications link with instruments. The Mac, which doesn't have internal slots for plug-in boards, requires a peripheral box with its own microprocessor. The third method uses the IEEE-488 standard bus interface to connect instrumentation to the Mac. Its transfer rate is typically faster than that of the RS-232, and you can link as many as 16 devices in a system.

LabView

One sophisticated new data acquisition/instrument control system is *LabView,* from National Instruments Corporation. "Three years ago we decided to provide the next-generation solution for people who want to automate testing," says Ron Wolfe of National Instruments, "so we looked at the industry and found that software was the major bottleneck. It's very expensive for physicists or chemists who know what they want to study BASIC to learn how to do it."

LabView uses the IEEE-488 bus interface and offers an intuitive, iconic programming environment for creating *virtual instruments,* software programs that drive instrumentation. For instance, a virtual instrument might display front-panel controls to a Hewlett-Packard voltmeter on the Mac screen. You manipulate the voltmeter remotely by adjusting the front-panel controls on the Mac screen.

To create a virtual instrument, you first design a graphic front-control panel on the Mac, with knobs, dials, toggle switches, graphs, meters, and so forth. To execute an operation, you design a block diagram by arranging the graph elements on screen and by specifying the flow of data from the input controls, through internal processing functions, to output display terminals. The panel visually represents the inputs required to configure a system and the outputs, or results, of the instrument's executions. The diagram is analogous to a subroutine or program in a traditional programming environment. You can reduce virtual instruments to single icons, which you can then incorporate into a higher-level diagram. The software has many built-in functions, including program control structures, mathematical and statistical functions, signal processing, curve fitting, and a database.



LabView *from National Instruments allows scientists to create virtual instruments that drive sophisticated IEEE-4888 data acquisition instrumentation. Iconic block diagrams include all instrument-specific remote-control details.*

Production testing is a major application area, says Wolfe, who thinks *LabView* will be used to test capacitors, power supplies, disk drive boards, audio equipment, and other devices. It also controls some 5000 models of instruments and conducts experimental simulations. *LabView* works with the common IEEE-488 interface as well as with the slower RS-232.

National Instruments offers GPIB-Mac, a full-function IEEE-488 interface box that connects to the Mac. The company also sells MacBus, a SCSI peripheral that hooks up to the serial port on a Mac Plus. The $1695 device allows you to plug in data acquisition boards (designed for IBM PC-type personal computers) that use the IEEE-488 interface. MacBus makes a wide range of low-cost data acquisition boards available.

MacADIOS

Among *LabView*'s competitors is MacADIOS, a peripheral unit from GW Instruments that has graphic waveform display. Unlike *LabView,* which requires often expensive instrumentation such as voltmeters and function generators, MacADIOS has several built-

in devices that let the Mac function as a spectrum analyzer, a spectrograph, an x-y recorder, and an eight-channel voltmeter, as well as emulate a low-frequency oscilloscope. Most researchers use MacADIOS Manager, software that allows them to input, output, edit, view, and store data. The software includes a library of 55 functions for data acquisition and manipulation plus a macro feature for setting up automated action sequences, and it allows the use of BASIC and C for designing experiments. You can also program it to analyze signals with frequencies of up to 10 kHz. The complete system, including hardware and software, costs $2500.

An interesting offshoot of MacADIOS is MacSpeech Lab, which lets the Mac produce voiceprints, known as spectrograms. Until recently, digital voiceprint machines sold for $15,000 or more, but MacSpeech Lab with printer and MacADIOS costs less than $6000. The Rhode Island School for the Deaf has ordered one, hoping that its immediate visual representation of speech patterns will help deaf children learn to talk. MacSpeech Lab was also used during a recent San Diego murder trial, when the defense needed to show the speed at which a gun had been fired. A tape recorder happened to pick up the barely audible gunshots, and MacSpeech Lab enhanced their sound for the jury.

BenchTop

Another data acquisition system is the BenchTop Instrument, a peripheral box developed by Richard Crandall at Reed College and available from Metaresearch. The BenchTop Instrument comes with software to turn the Mac into an oscilloscope, a voltmeter, a spectrum analyzer, a frequency counter, and a digital I/O display. For other tasks, the user writes the software. The box itself is hardware, featuring an Intel 8031 central processor, 2K of RAM, a ROM operating system, 28 I/O ports, and baud rates of up to 38,400 bps. It plugs into the Mac through the serial port. You can add such accessories as analog/digital and digital/analog converters, extra RAM, and various connectors. The software includes an assembler/editor/loader; the BenchTop Operating System, for handling networks of up to 256 BenchTop Instruments; Rascal (real-time Pascal), a fast programming language invented for this device; and the Rascal BenchTop Environment.

Professor Allan Wagner, chairman of Yale University's psychology department, is using the BenchTop Instrument in animal behavior research. BenchTop controls devices that send stimuli to animals and records their responses, such as the pressing of a bar. Wagner, who has used a computer in his lab for 15 years, feels that the Mac makes a big difference. "Everyone who works in the lab is equally able to interact with the computer," he says. "It gets much more use, and it doesn't eat up the career of someone who isn't a computer expert."

Macquisition and MacControl

Small Business Computers of New England offers two more software products: *Macquisition* and *MacControl. Macquisition* collects data and enters it, raw or analyzed, into a Macintosh spreadsheet. *MacControl* monitors analog or digital instruments, collects a preset number of samples, and sends analog or digital values to other parts of the system. Both programs require Microsoft BASIC 2.1 and the Taurus One/05, an I/O peripheral that links the modem port with the sensors.

Data Manipulation

Once scientists acquire data, they must still perform computations with it. Many Macintosh statistics programs, such as *Stat80, StatView,* and *Statworks,* are available for analyzing data. *MacSpin,* from D^2 Software, makes notable use of graphics. Though strictly speaking it is a multivariate program rather than a statistical one, *MacSpin* offers many number-juggling capacities. You enter data in a spreadsheet-like format, and *MacSpin* generates a 3-D image of the data (see "3-D Data," *Macworld,* August 1986).

STELLA, from High Performance Systems, enables researchers to set up logical models, which can then easily perform simulations or analyze constructs (see "Mac Modeling," *Macworld,* September 1986). "It has a wonderful way of letting you set up complex mathematics at a conceptual level," says chemist Allan Smith of Drexel University.

Cricket Graph is another innovative product, a chart program with special features for scientists.

Dr. Paul Daley of Lawrence Livermore National Laboratory uses the Macintosh to perform spectroscopic analyses with a special fiber-optic chemical-sensing system.

Labtop Tools

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Portland, OR 97202
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ChemDraw
Stewart Rubenstein
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Somerville, MA 02143
617/495-4707
List price: $495 (40 percent academic discount available)

Cricket Graph, Statworks
Cricket Software
3508 Market St. #206
Philadelphia, PA 19104
215/387-7955
List price: Cricket Graph $195, customized versions for film recorders and specialized printers $495; Statworks $125

DNA Inspector II
Textco
27 Gilson Rd.
West Lebanon, NH 03784
603/643-1471
List price: $245 plus $5 shipping and handling

LabView, GPIB-Mac, MacBus
National Instruments
12109 Technology Blvd.
Austin, TX 78727
512/250-9119
List price: LabView $1995; GPIB-Mac $595; MacBus $1495, requires interface software $200

MacADIOS, MacSpeech Lab
GW Instruments
P.O. Box 547
Cambridge, MA 02142
617/577-1524
List price: MacADIOS $2500, MacSpeech Lab $300

MacChemistry
Fortnum Software
31 W. Sierra Madre Blvd.
Huntington Beach, CA 91024
818/355-7114
List price: $145

Macquisition, MacControl, Taurus One/05
Small Business Computers of New England, Inc.
4 Limbo Ln.
P.O. Box 397
Amherst, NH 03031
603/673-0228
List price: Macquisition $450, MacControl $695, Taurus One/05 $2595

MacSpin
D² Software
3001 N. Lamar Blvd. #10
Austin, TX 78705
512/482-8933
List price: $99.95

StatView
Brainpower, Inc.
24009 Ventura Blvd.
Calabasas, CA 91302
818/884-6911
List price: $69, StatView 512+ $179

Stat80
Statware
2831 E. Tenth St. #3
Tulsa, OK 74104
918/583-4149
List price: standard version $249, professional version $399

STELLA
High Performance Systems
13 Dartmouth College Hwy.
Lyme, NH 03768
603/795-4122
List price: $200

Made by Cricket Software, the program not only plots 12 graph types—including polar and double-*y*—and prints them in eight colors, it also performs mathematical operations on the data and summarizes it with curves drawn using regression and interpolation formulas (see "The Kingpin of Presentation Graphics," *Macworld,* July 1986).

The Future of the Labtop Mac

The future of the labtop Mac depends mainly on its software, but the machine would also benefit from the addition of certain hardware features. An open architecture would allow direct memory access and expedite data acquisition from external devices. A larger screen would increase the amount of information scientists could study at one time. A floating-point coprocessor would accelerate calculations and make tasks such as 3-D modeling more feasible (see "New Ways to a Faster Mac," *Macworld,* August 1986). The extent to which Apple incorporates such features in its next version of the Macintosh will go far to determine the Mac's success in the labtop world. □

Dan McNeill and Paul Freiberger have coauthored several books, including Computer Sense *(Bantam, 1986) and are contributors to* MacOffice *(Compute! Publications, 1985).*

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Macware Reviews

Word Handler, Micro Planner Plus, Acta, ColorChart, Graphics Magician, Turbo Maccountant, Evelyn Wood Dynamic Reader, Smart Eyes, Softstrip, and Mac +II

Edited by Janet McCandless

A New Handle on Words

Did you ever wonder why there are more than a dozen database programs for the Macintosh when, until recently, there were only two word processors? Are *MacWrite* and *Microsoft Word* that good, or have they lorded it over the word processing domain because publishers believed they couldn't compete? *MacWrite* was bundled with the Mac until January of this year, and the more advanced *Word* was backed by Microsoft's prodigious marketing clout. With such limited choices and innovation, Macintosh owners were the losers in this nonbattle of corporate giants.

When Apple unbundled *MacWrite,* developers saw a chance to offer alternatives to the established Macintosh word processors. The first to reach store shelves is ***Word Handler,*** with which Advanced Logic Systems hopes to lure *MacWrite* owners by charging $29.95, instead of the $79.95 list price, if they send in a legitimate *MacWrite* disk before the end of October.

The designers must have carefully analyzed *MacWrite* and *Word,* since they included characteristics and features from both in their hybrid product. In general, *Word Handler* maintains *MacWrite*'s simplicity and ease of use. The program avoids overusing dialog boxes; almost every command and procedure is available from the menus. Like *Word, Word Handler* lets you open up to four documents at once, has a glossary feature, and is paragraph based. Unfortunately, the program's performance is slow, and it doesn't accept graphics.

MARK ULRICH

Filing, Editing, and Searching

Word Handler follows the standard Macintosh interface for most document editing and filing tasks, and it adds some convenient options. When you open a new document, the program first asks you to name it (rather than opening an "untitled" document as does *MacWrite* or *Word*) and asks if you want to create a backup copy. Creating backup copies of documents is always a good safety measure. You'll find no Save As command, but the Copy Doc command lets you create a copy and give it another name.

The Change Case feature adds some useful style options for selected characters or words, letting you toggle between uppercase and lowercase characters, invert the case of individual characters within a selection, or set initial caps.

Another practical feature is the Abbreviation function. Similar to *Word*'s glossary function (but easier to use), it lets you specify abbreviations for commmonly used words or phrases, and the program creates a glossary of equivalents. After you've typed an abbreviation (which can be up to 44 characters), you can expand it with a single keystroke.

Word Handler's Fill-in feature creates form documents with variable fields, such as name and address. The Insert Field command displays a set of brackets within which you type the field name. When you fill in a form letter, for example, the program displays the field name and prompts you to fill in the information. Although it's not nearly as flexible as *Word*'s print merge feature, Fill-in is easy to use and adequate for simple forms. *Word Handler*'s search commands allow you to search for whole words, phrases, partial words, or strings. Other options let you jump to the next page or paragraph, moving forward or backward through the document.

Among *Word Handler*'s most useful commands are the utility options. You can create text-only copies of documents, open text-only or *MacWrite* documents, plus rename and delete documents (see "Han-

(continues)

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dling Words Simply"). (In other programs you can only perform these operations at the Finder level.) *Word Handler* also lets you append one document to another and display word counts and page numbers.

Document Formatting

Like *Word, Word Handler* is paragraph oriented. Each paragraph carries its own formatting information. You set top and bottom margins, page numbering, and header and footer distance from top and bottom of documents in the Document Format dialog box.

One design flaw is *Word Handler*'s method of adjusting ruler settings. While you need not insert a new ruler each time you change margins or indents, you must select the Format Section option to set tabs or margins, tab style (regular or decimal), line spacing, or justification. And although you can show the ruler at any time, it is inactive unless the Format Section dialog box is displayed. You should be able to adjust ruler settings without displaying the dialog box, as well as set margins in either the ruler or the dialog box, as you can in *Word*.

Show Margin displays the left and right margins as they will look on the printed document. But the command works only when the Show Top & Bottom command (which displays the top and bottom margins set in the Format Document dialog box) is active. Alternatively, you can hide those margins so that the full screen displays text.

Headers and Footers

Headers and footers in *Word Handler* are similar to those in *Word*. To create them, select the appropriate text and choose the header or footer option. You can include up to three lines of text in any font or type style, and the text can be flush left, centered, or right-justified. For automatic page numbering, include a number sign (#) as part of the header or footer. The program does not support time stamping in headers or footers.

Performance Problems

Working on a 512K Macintosh with HyperDrive, *Word Handler*'s performance is slow compared to its competitors, even for standard operations such as scrolling, inserting and deleting text, reformatting documents, and cutting and pasting. Using a Mac Plus alleviates most of that problem. *Word Handler*'s major flaw is its inability to import graphic data, such as charts or *MacPaint* pictures. In addition, the program cannot load into *Switcher* on a 512K Mac.

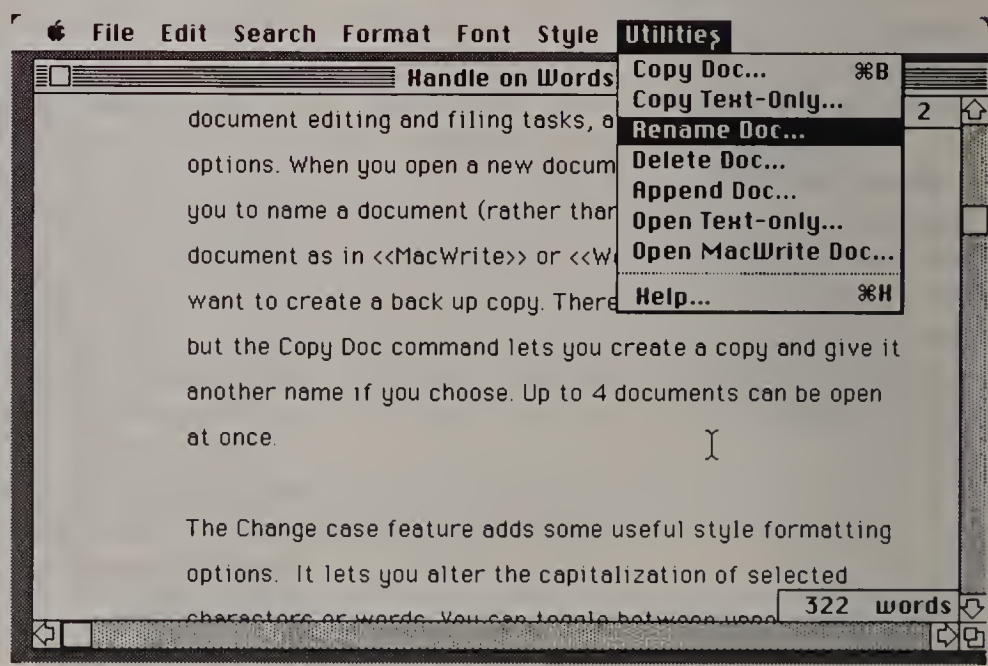
Another serious problem is that the Undo buffer doesn't undo (or redo) the last operation–it simply restores deleted text. If you "undo" a word you just typed, the program inserts the last deletion at the cursor.

Because *Word Handler* saves documents automatically when you close or quit, you don't have the option of abandoning your changes, although you can circumvent this problem if you've made a backup copy of the unchanged version.

Headers and footers exhibit some unusual behavior as well. Only the default margins apply to headers and footers. If you create a document with margins narrower than the defaults and set the header or footer to appear flush left or right-justified, the headers and footers still appear at

(continues)

Handling Words Simply
Word Handler's *most useful features are its utility and abbreviation options. Unfortunately, the program does not accept graphics.*



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the default margins. And when you choose Show Top & Bottom (margins), the cursor jumps to the top of the document rather than staying at the original position in the document.

The Final Word

Certainly *Word Handler* has some useful features that make it an appealing alternative to *MacWrite:* multiwindowing, utilities, an abbreviation function, and fill-in options. The on-line help is adequate, although it's slow to load if you choose sections from the end of the help file; the manual is thorough and well indexed. But even with *Word Handler*'s low price of $29.95 or $79.95 (compared to $125 for *MacWrite* and $195 for *Word*), Advanced Logic Systems needs to remedy the program's slowness, its lack of graphics, and its crippled Undo command before it can give *MacWrite* or *Word* a run for the money.—*Daniel Farber*

Word Handler, version 1.1
Advanced Logic Systems, Inc.
1283 Reamwood Ave.
Sunnyvale, CA 94089
408/747-1988
List price: $79.95

Big Plans

Project-management software users are either planning professionals or general business managers. Planning professionals orchestrate the logistics of complex projects, particularly those associated with construction and high technology. While they don't manage complex development projects, business managers value project management tools for their own undertakings, especially the appealing presentation graphics such programs produce.

MacProject is probably the best known project-management package for the Macintosh. Although it's an excellent program for simple projects and for creating presentation graphics, *MacProject* can't handle the demands of large projects. For more complicated tracking and for more help in actually managing large projects through to a successful conclusion, ***Micro Planner Plus,*** from Micro Planning Software, is a better choice.

Taking Control

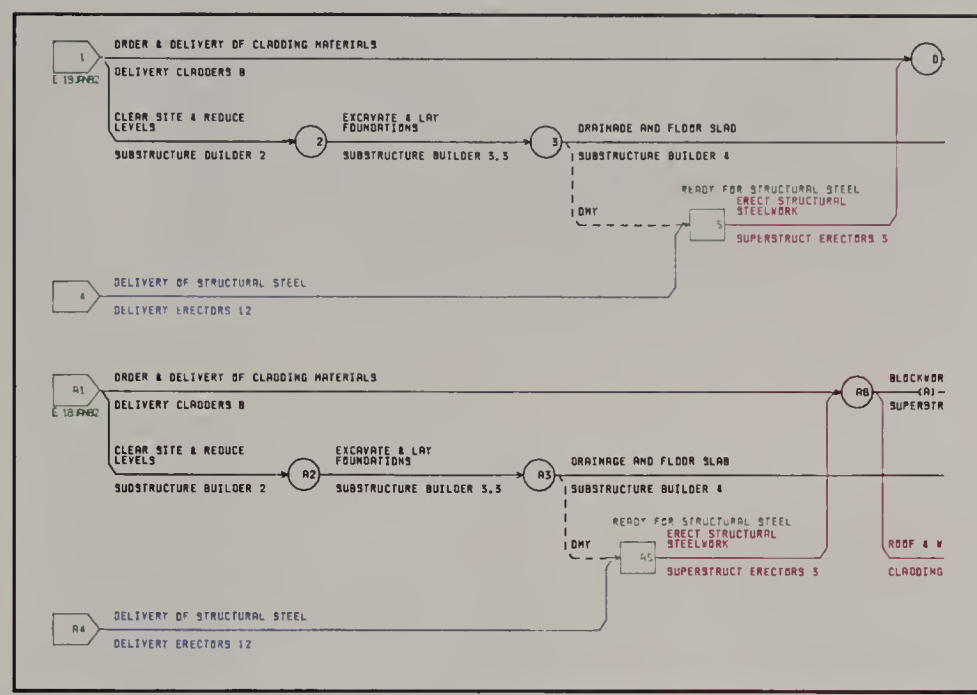
Micro Planner Plus is aimed at planning professionals who direct and coordinate projects involving several departments and anywhere from 50 to 500 separate tasks. The program creates a critical-path chart, tracks projects, performs sophisticated resource analysis, and generates a large variety of reports on the work in progress. *Micro Planner* is already employed in complex planning projects such as Martin Marietta's work on the Orbiting Maneuvering Vehicle, a utility vehicle that will be used for construction in space.

Micro Planner Plus improves on an earlier version by giving users more control over a project's on-screen viewing size, the ability to preview output, and more control over a report's final appearance. Most notably, the new version is easier to use. Since it's optimized for the Mac Plus, the program can store up to 1500 activities within a megabyte of RAM. *Micro Planner Plus*'s ability to store files in RAM improves performance over the earlier disk-based version. This copy-protected program requires at least 512K of RAM.

Machine-Drawn

Micro Planner Plus does a good job of drawing planning charts, although this may not be obvious at first. Unlike the straightforward drafting function of *MacProject,* which lets you simply draw a series of task boxes and connect them with lines, *Micro Planner Plus* displays only one or two tasks at a time on screen. To see the whole chart, you must pull down the Analyze menu and ask the program to generate a time-critical project diagram. The software draws the chart automatically, arranging tasks and milestones on the page as a series of gently curving lines and circles.

The convenience of the automatic drawing feature may be appreciated by managers who are not artistically inclined and who hate drawing and redrawing PERT (Program Evaluation and Review Technique) charts. However, automatic drawing might annoy those who prefer more graphic control over their charts, although they can still customize by converting the charts into *MacDraw* documents for embellishment. The program prints reports in different fonts and sizes on the LaserWriter, ImageWriter II, and wide-carriage ImageWriter.



Network Diagram
For each project, Micro Planner *can create a network diagram that shows the relationships between separate job tasks. Network diagrams can grow quite large. A detail of a larger diagram is shown here.*

In its favor, *Micro Planner* uses the standard format for diagrams, making it familiar to planners who have used either the PERT or CPM (Critical Path Method) techniques. In these formats, circles represent events, and arrows indicate activities. *MacProject,* on the other hand, represents activities with rectangles and relationships with lines, which goes against the grain of accepted planning methods.

Planning Savvy

Like virtually every project management package, *Micro Planner Plus* calculates the earliest dates, the latest dates, any slack or float time, and the critical path—but it also creates up to six calendars for each activity. The program cranks a lot of savvy into the planning process by telling you in the manual exactly how to build your plan from the ground up: first create the planning chart, concentrating on task sequence and logic instead of how long each task will take; then estimate task durations without considering the available resources.

Since first estimates are usually too long, you'll probably end up with a preliminary plan that won't meet your deadlines. But you'll find that *Micro Planner* has some tricks to improve time estimates. A time analysis bar chart helps you choose an earlier date that might be feasible. You can enter that date as a deadline, but that produces tasks with "negative float." However, your next printout—the Supercritical Activities Report—highlights such tasks so you can evaluate the possibility of shortening the times or overlapping the jobs. This kind of software-assisted trial and error helps you come up with workable plans that meet your time requirements.

Limited Resources

In addition to drawing charts and time planning, *Micro Planner Plus* has a sophisticated resource-analysis routine. Planners often assume unlimited personnel and resources for a project and then end up spending a fortune on contract labor, air freight, and equipment rental. Consider the now canceled Magnetic Mirror Fusion Test Facility at Lawrence Livermore Laboratories in California. Construction of the huge, multistory test apparatus ran into trouble when five major assemblies were scheduled to commence at exactly the same time. Unfortunately, each task required its own construction crane for heavy hoisting, but only one crane was available.

Money, too, can be a critical resource, as many builders know. Typical building construction requires large amounts of money near the end of the job, whereas an aerospace project's heaviest cash demands occur in the beginning.

Breaking Up Bottlenecks

Micro Planner helps you avoid resource bottlenecks. If several tasks compete for the same resources, a resource analysis routine will reschedule those tasks, delaying the noncritical ones and allocating resources to the jobs that must be done for the project to finish on time.

But sometimes, even with clever resource management, there's no getting around it: you must either delay your project or overload the available resources to get the job done on an emergency basis. In

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that case, the resource analysis spells out your options: it shows how long the job will take with the available resources, or—if you must meet your deadline—it tells you what resources you will need to finish on time.

Managing Results

Just as important as good planning is the ability to keep your project on track and bring it to a satisfactory conclusion. *Micro Planner*'s second strength is in managing the project as work progresses. The program compares actual performance against the original schedule stored in the Master Archive. If your project has been delayed, you can highlight the delay paths and pinpoint the sources of your problems for corrective action. Using the program's select and sort capabilities, you can customize progress reports on the planning schedules of individual departments.

Micro Planner Plus is expensive by Macintosh software standards, and it inevitably takes longer to master than a simple package. Still, the program is likely to seem a bargain to managers who need full-blown project-tracking capability and who are used to expensive mainframe systems.

Micro Planner's graphics, menus, and procedures are not as simple and intuitional as those found in *MacProject*. There is simply more to learn about reports, resource leveling, and dozens of other concepts; and there are more mistakes and experiments to be made along the way. This may not be a problem for those used to sophisticated mainframe project-management tools such as *Artemis,* but others might benefit from some consulting help in the very beginning.

At $495, *Micro Planner Plus* won't replace *MacProject* as a general planning tool—nor should it. *MacProject* remains the better tool for relatively simple planning jobs and presentations. But *Micro Planner Plus* is preferable for high-level projects that require full-blown resource management and tracking features.—*Tom Shea*

Micro Planner Plus
Micro Planning Software, USA
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MARK ULRICH

A Hard Act to Follow

I've always thought that outlines and outline programs were a wonderful idea. But full-scale application programs such as *ThinkTank* and *MaxThink* require *Switcher* to work with my word processor, and sometimes they seem like overkill when all I want is to make a simple outline. With its outlining program ***Acta,*** Symmetry has produced the perfect solution to my problem. Relatively plain by application program standards, *Acta* is a sophisticated desk accessory for people who want an organizational aid to use with other programs. Since it is a desk accessory, you can keep it in view as you work, call it up at any time, and copy all or part of your outline into your main application via the Clipboard.

Word Wrap for Headers

Constructing an outline with *Acta* is straightforward. A new document window opens with the first line (or topic) of the outline, highlighted with a shaded rectangle and a black triangle at the far left. To place text within the first topic, simply start typing. You can write as much as you like; word wrap is automatic, and pressing Return starts a new paragraph (not a new topic, as in *MaxThink*). You use standard Macintosh techniques for editing text—unlike *ThinkTank,* which has a special window for writing and editing large blocks of text. New topics are created with commands from the *Acta* menu (which is added to the ones in your application) or with easy-to-remember ⌘-key equivalents. When a new subtopic is created, the triangle next to the original topic becomes hollow to show that it now contains a subtopic (see "Under Cover.")

Once you have a few topics and subtopics to play with, you can work on the outline's organization. To make the outline easier to manipulate and view, you can reduce topics and graphics longer than one line to show only the first line, and topics containing subtopics can be expanded or collapsed with a double-click of the mouse, a ⌘-key combination, or a menu selection. Moving topics is just as easy (and similar to the method used by *ThinkTank*). You can subordinate a topic to the one above it using the mouse, the keyboard, or the menu. For more complex moves, such as making a subordinate heading a major heading, you cut and paste a topic (and all its subtopics), or drag it by its triangle to a new position.

Like *ThinkTank* and *MaxThink, Acta* also has a number of features that can make organizing your outline easier. You can sort the subtopics of a selected topic alphabetically or numerically and paste pictures into your outline (although you cannot mix pictures and text within the same topic). Unlike with *ThinkTank* and *MaxThink,* however, you can choose among eight fonts, seven point sizes, and five type styles to accent a single topic or a topic with all its subtopics. Also, you can have a single main topic (the only option in *ThinkTank* and *MaxThink)* or multiple main topics within a single outline. This option is set when you start to work, or you can make it permanent by using the Convert/Configure program.

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The Trade-offs of a Desk Accessory

Because *Acta* is a desk accessory, however, Symmetry had to leave out some of the features that *ThinkTank* and *MaxThink* owners take for granted. *Acta* can search for a character sequence, but it has no Replace function. It has nothing comparable to *MaxThink*'s Sort commands or *ThinkTank*'s Slide Show. The most notable omission, however, is the lack of a Print command. To print an outline, you must either copy it to the Clipboard and paste it into your word processor or save it in *MacWrite* or text-only format for printing later. Outlines saved in *MacWrite* format retain all their formatting; those saved in text-only format lose all font selections and pictures. Outlines can also be saved in *Acta* format, to be reopened by *Acta* at any time.

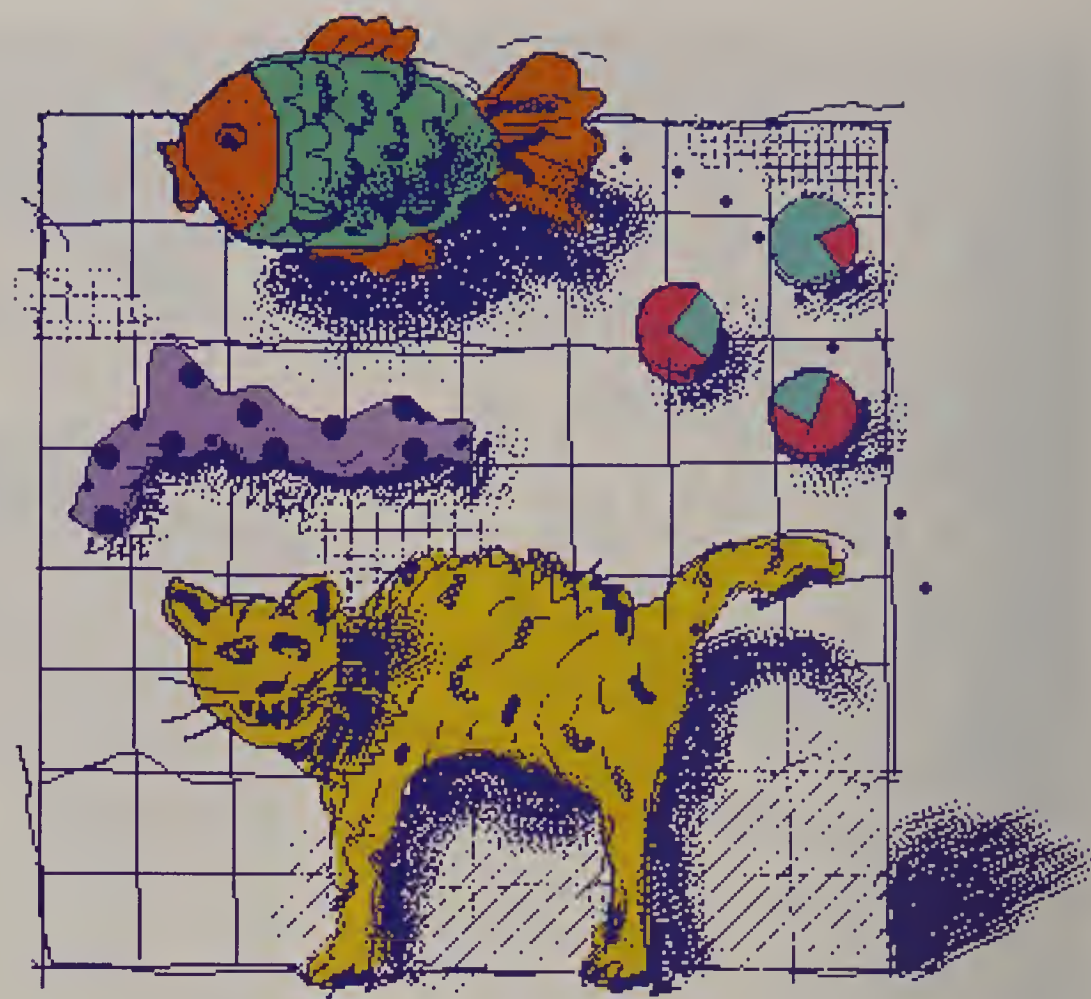
On the other hand, *Acta* has some sophisticated features for a desk accessory program. If you accidentally close an application with an unsaved *Acta* outline in memory, *Acta* will interrupt the quit process and ask if you want to save it.

Since Apple restricts the number of desk accessories you can have, you can use *Acta* to perform the function of several desk accessory programs and thus conserve space under the Apple menu. By creating the appropriate *Acta* outline, you can use *Acta* to replace both the Notebook and the Scrapbook, as well as add an area-code list and a date book.

To the Point

While *Acta* is not loaded with extras as are *ThinkTank* and *MaxThink*, it is a good basic outliner for people who want to use outlines in conjunction with other applications. It behaves remarkably well with most applications, although some, such as *MacPaint* and *MacDraw* (but not *FullPaint*), require you to quit *Acta* before resuming work. For those who have been looking for an outliner that works with most programs and is always at hand, *Acta*'s limitations are minor inconveniences. Indeed, if there is one desk accessory I must have on every application disk from now on, *Acta* is it.—*Robert C. Eckhardt*

Acta, version 1.0
Symmetry Corporation
761 E. University Dr.
Mesa, AZ 85203
800/624-2485 for orders only,
602/844-2199
List price: $59.95



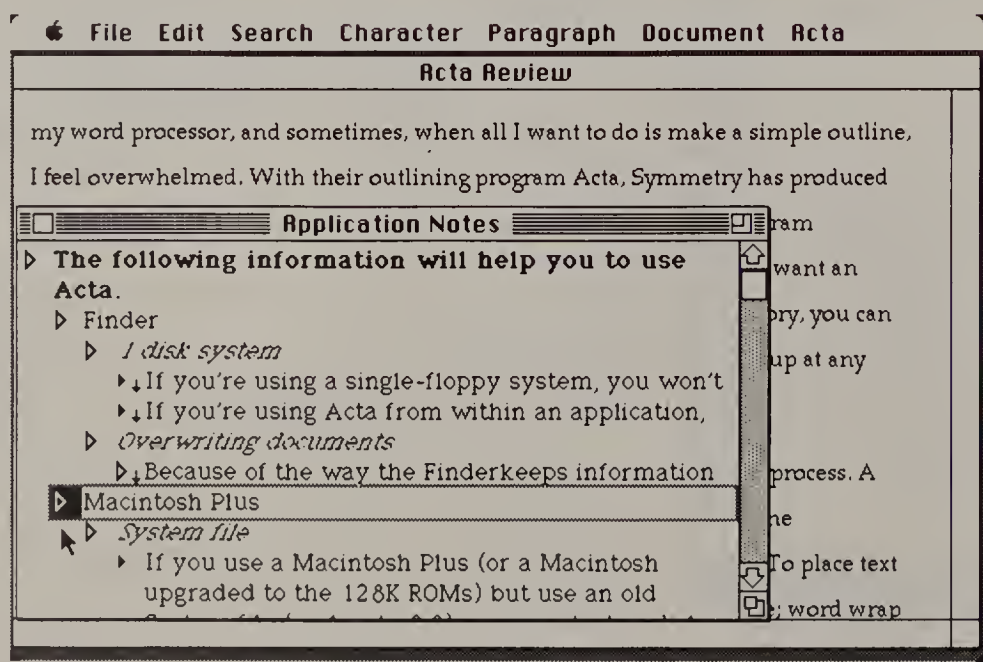
MARK ULRICH

The Chart Spectrum

Before the introduction of the ImageWriter II with its color capability, or the spate of plotter drivers recently released for the Macintosh, Esoft Enterprises anticipated the need for color graphics with its ***ColorChart*** plotting program. This business graphics program was originally designed to produce color graphics on the ImageWriter I with a cumbersome technique that used multiple passes and changes of colored ribbons. The program now works with the ImageWriter I/II, LaserWriter, HP 7470, 7475, 7475A, 7550, ColorPro, and ApplePlotter. But even without its ability to produce color output for reports or presentations, *ColorChart* would merit serious consideration in the small business community for its low price and all-around plotting performance.

Data Points

Eight menus in addition to the Apple menu allow one to create, edit, and customize both data and graphics. You can enter data directly into the program in a spreadsheetlike table or transfer data from programs like *Multiplan, Excel, Jazz* and *Crunch* via the Clipboard. You can create *ColorChart* files, text files (data only), and *MacPaint*-compatible documents and embellish them in *MacDraw* or *MacDraft* via the Clipboard.



Under Cover
In Acta, *each topic can be displayed in a different font or style. An open triangle indicates that a topic contains subtopics, a black triangle, that it does not. An arrow next to the triangle means that text after the first line of the topic has been hidden.*

Data capacity is generous: the program handles up to eight columns of data, each column containing up to 256 points. Compare this to *Microsoft Chart*'s multiple series of 64 data pairs, *Excel*'s 256 columns with 100 data points each, and Cricket Graph's 40 columns with 1000 data points per column.

You can manipulate data by creating new columns based on arithmetic and trigonometric transformations of existing data columns (a total of 26 different operations). The data transformation capabilities, while extensive, are limited to entire columns of data. On the whole, the descriptive functions (average, trend, growth, and statistics) of *Microsoft Chart* are probably more useful. A variety of fonts, styles, and data formats–including general, dollar, percent, scientific, decimal, and integer–are also provided for viewing and printing tabular data.

The Composite Chart

You can create pie, bar, line, x-y, and scatter charts (see "Color Results"). One basic chart type, area charts, can't be produced. You can, however, create High-Low-Close charts for charting stock market performance. You can also customize charts with 30 marks, 3 line widths, 38 patterns, and 8 colors. Pie segments can be exploded in three steps (small, normal, and large), bars can be stacked, axis titles can be staggered (useful for long titles), axis ranges can be specified, and axis and chart titles can be modified. The documentation even suggests ways of modifying the patterns and marks using the resource editor. It's easy to change and even mix colors using the Customize menu with its palette of available colors.

Depending on the drivers installed in the system folder, the Output menu automatically shows ImageWriter I/II and LaserWriter along with Apple and HP plotters. Communication parameters for the plotters can be selected and changed. *ColorChart* can drive a variety of HP plotters in addition to the Apple Plotter (although only the HP 7475A is listed in the menu).

ColorChart is not highly intuitive and requires frequent reference to its extensive but poorly written manual. *ColorChart* also has a few irritating minor bugs. If you

(continues)

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MODULA-2

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- FULL interface to Mac Toolbox as outlined in Inside Macintosh
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- Phone and network customer support provided
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- 3d graphics and multi-tasking demos
- Full Screen Editor linked to compiler locates and identifies all errors
- 350-page manual
- No royalties or copy protection
- Resource Compiler
- 512K Mac, Mac Plus, HFS

Pascal and Modula-2 source code are nearly identical. Modula-2 should be thought of as an enhanced superset of Pascal. Professor Niklaus Wirth (the creator of Pascal) designed Modula-2 to replace Pascal.

Added features of Modula-2 not found in Pascal

- CASE has an ELSE and may contain subranges
- Programs may be broken up into Modules for separate compilation
- Machine level interface
  - Bit-wise operators
  - Direct port and Memory access
  - Absolute addressing
  - Interrupt structure
- Dynamic strings that may be any size
- Multi-tasking is supported
- Procedure variables
- Module version control
- Programmer definable scope of objects
- Open array parameters (VAR r: ARRAY OF REALS;)
- Elegant type transfer functions

Mac Plus Benchmarks (secs)	Compile	Link	Execute	Optomized Size
Sieve of Eratosthenes:	7.3	5.8	5.1	1257 bytes
Float	8.0	8.6	10.3	3944 bytes
Calc	6.8	5.7	4.3	1736 bytes
Null program	5.7	5.6	—	1100 bytes

```
MODULE  Sieve;
CONST   Size = 8190;
TYPE    FlagRange = [0..Size];
        FlagSet = SET OF FlagRange;
VAR     Flags FlagSet;
        i:    FlagRange;
        Prime, k, Count, Iter: CARDINAL;
BEGIN   (*$S-,$R-,$A+ *)
  FOR Iter:= 1 TO 10 DO
    Count:= 0;
    Flags:= FlagSet(); (* empty set *)
    FOR i:= 0 TO Size DO
      IF (i IN Flags) THEN
        Prime:= (i * 2) + 3; k:= i + Prime;
        WHILE k <= Size DO
          INCL (Flags, k);
          k:= k + Prime;
        END;
        Count:= Count + 1;
      END;
    END;
  END;
END Sieve.
```

```
MODULE Float;
FROM MathLib0 IMPORT sin, ln, exp,
                     sqrt, arctan;
VAR x,y: REAL; i: CARDINAL;
BEGIN (*$T-,$A-,$S-*)
  x:= 1.0;
  FOR i:= 1 TO 1000 DO
    y:= sin (x); y:= ln (x); y:= exp (x);
    y:= sqrt (x); y:= arctan (x);
    x:= x + 0.01;
  END;
END float.
```

```
MODULE calc;
VAR a,b,c; REAL; n, i. CARDINAL.
BEGIN (*$T-,$A-,$S-*)
  n:= 5000;
  a:= 2.71828; b:= 3.14159; c:= 1.0;
  FOR i:= I TO n DO
    c:= c*a; c:= c*b; c:= c/a; c:= c/b;
  END;
END calc.
```

Product History

The TDI Modula-2 compiler has been running on the Pinnacle supermicro (August '84), Atari ST (August '85), Amiga (January '86) and will soon appear on UNIX in the fourth quarter '86.

Regular Version $89.95 Developer's Version $149.95 Commercial Version $299.95

The regular version contains all the features listed above. The developer's version contains additional Mac modules, macros and demonstration programs – a symbol file decoder – link and load file disassemblers – a source file cross referencer – the kermit file transfer utility – a Modula-2 CLI. The commercial version contains all of the Mac module source files.

Other Modula-2 Products

Kermit	– Contains full source plus $15 connect time to Compuserve.	$29.95
Examples	– Many of programs from Inside Macintosh translated into Modula-2.	$24.95
GRID	– Sophisticated multi-key file access method with over 30 procedures to access variable length records.	$49.95

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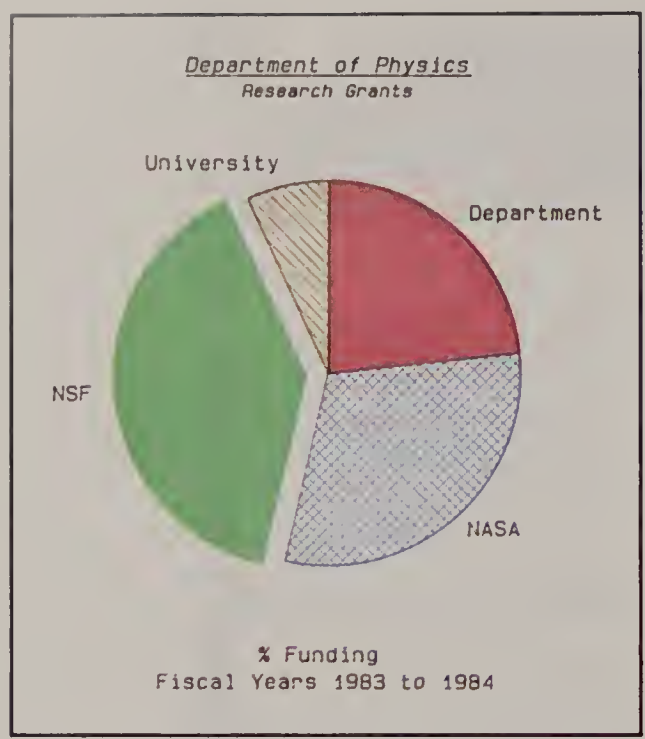

Color Results
A pie chart created with ColorChart *and plotted with the HP ColorPro (equipped with a graphics enhancement chip). Pie segments can be exploded to three different sizes; each segment can be customized using a palette of 36 patterns and 8 colors.*

explode a pie segment, *ColorChart* may not plot the pulled segment unless you select this option last. Another bug cuts off portions of large titles.

Although not as powerful as the competition, *ColorChart* is much less expensive and is a solid graphing program in its own right. For the budget-minded user requiring color output of business graphics, perhaps even on the ImageWriter I, it is a cost-effective solution.—*Prasad Kaipa and Edwin Haskell*

ColorChart
I/O Design, Inc.
P.O. Box 156
Exton, PA 19341
800/241-2122, 201/747-0943
List price: $39.95

Animation Magic

Words are not enough. These days, many computer adventure games include graphics as well as text. But adding pictures—especially moving ones—to a program can be a difficult and time-consuming chore. ***The Graphics Magician,*** from Polarware/Penguin, lets you create animated sequences or static scenes and put them in your own programs. Animations or drawings created with *Graphics Magician* can be loaded into programs written in Microsoft BASIC, MDS Assembly, Lisa Pascal, Lisa Assembler, or Think Technologies Pascal.

Graphics Magician's program disk is divided into two basic parts, the Painter and the Animator. With the Painter you create pictures that are stored in a compact format, increasing the number of scenes you can put in an adventure game, for example. The Animator consists of three modules: the shape editor is used to create pictures; the path editor, to define their motion across the screen; and the choreographer, to propel shapes along a path. Once you've created and saved an animation sequence, you can load it into a program. A second disk, Samples and Interface, provides routines for loading and activating picture or animation files, as well as some sample animations. The programming manual and the samples on disk focus on Microsoft BASIC; instructions for interfacing *Graphics Magician* files to the other languages are found in *MacWrite* documents on the Samples and Interface disk.

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Space-Saving Pictures

Graphics Magician's Painter consists of a single subprogram, the picture editor, which stores drawings using a minimum of disk space. The picture editor screen looks somewhat like a minimalist's *MacPaint,* supplying a paint bucket, a paintbrush, line- and shape-drawing tools, text, and a palette of patterns. But despite this apparent similarity, the picture editor's storage technique is actually more like that of *MacDraw.* While *MacPaint* stores pictures as bit maps, or patterns of dots, the picture editor stores drawing commands and screen coordinates. To store a line, for example, it records the locations of the line's endpoints, rather than the individual dots that make up the line. You can single-step through the series of drawing movements that make up a picture (for example, draw a line, then draw a circle and fill it with a pattern), and edit the picture by clicking the Delete button to remove a step.

Graphics Magician retains that slightly foreign air typical of ported programs.

Although the picture editor saves storage space, it's difficult to achieve the detail of *MacPaint*-like bit-mapped drawings. For example, you can't sweep the paintbrush across an area as you can in *MacPaint;* instead, you must click the brush to deposit a pattern, move the brush and click again, and so on. The picture editor is ideal for creating graphics such as background scenes, which would take up considerable disk space if stored differently. But *Graphics Magician* gives animators another drawing environment—the shape editor.

The Animation Shapes Up

Like the picture editor, the shape editor provides a mini-*MacPaint* tool rack. The shape editor's tools include a pencil, a selection rectangle, a paintbrush, an eraser, and FatBits. You use the tools to draw a shape in a resizable drawing window, or animation frame (see "Frames of Reference"). Pictures can also be transferred from *MacPaint* to the shape editor.

You can draw a single shape or create "internal animation" of up to 20 frames within a shape. Think of the frame window as a stack of papers; a picture is animated like a paper "flip book," rapidly replacing one frame with the next to give the illusion of motion. Using internal animation, you might create a walking figure or a flapping bird. You can play back an entire multi-frame animation, adjusting its speed with a scroll bar, or view it frame-by-frame.

The shape editor has two features not found in other commercial Mac animation programs. One, called Mutate, is more commonly known as "in-betweening" or "'tweening"—the program automatically fills in intermediate steps between the designated starting and ending frames. If you draw a face in frame 1, for instance, and a pineapple in frame 20, the program will create the metamorphosis in frames 2 through 19 (see "Frames of Reference"). This feature not only saves you work, but is fun to watch. Another unique animation aid is Turn, which rotates an object around its center point in whatever increments you specify.

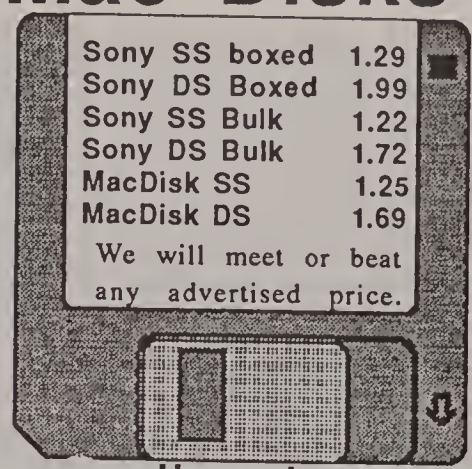
Path-ology and Choreography

An animation doesn't have to "run in place." Once you've created a single-frame or an animated shape, you can lay down a path for it to follow. In the path editor module, you use a pencil icon to draw a line across the screen. This path can be a simple curve or a collection of intricate zigzags and loops. The speed at which you draw determines how quickly an object will move along the path, while a grid allows you to move a shape in precise increments. Like the other modules, the path editor lets you modify a path by deleting one or more of the steps used to create it.

The choreographer module is where the action is; here is where the animation takes place. Windows list the shapes and paths created in the other modules, and you assign shapes to paths to produce animated sequences. You can create as many as 32 animated objects; each shape can have a unique path, or several can share a path.

(continues)

Mac Disks



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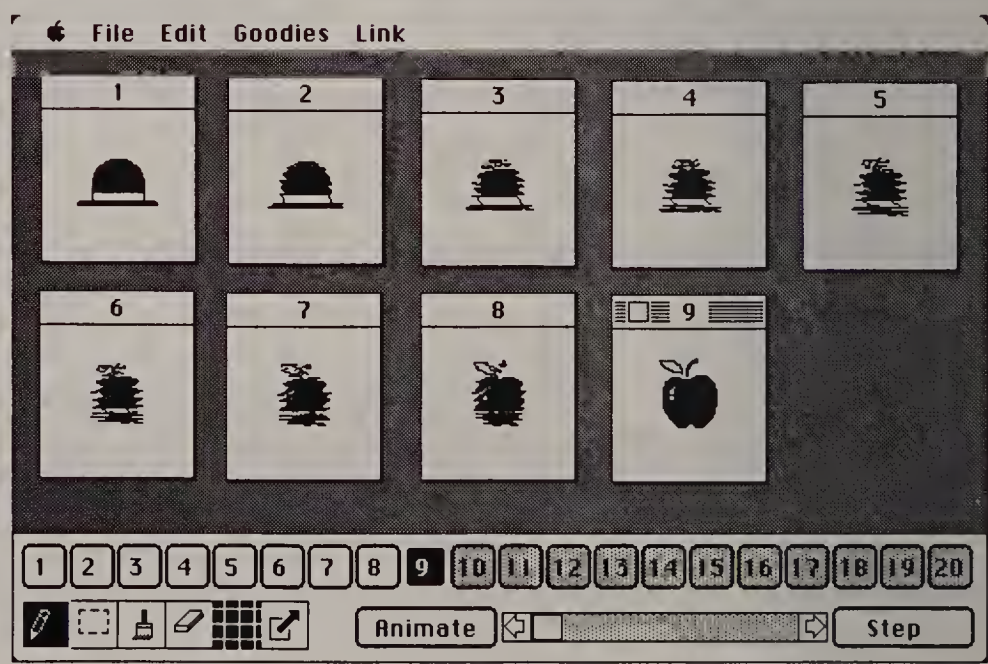
The Sorcerer's Apprentice

While *Graphics Magician* is a useful program, it's not for everybody. The instruction manual is adequate, but sketchy in places. For example, Chapter 4, "A Quick Tutorial," is just that—two pages out of a 40-page manual. You're given detailed information on each menu item but few suggestions for meshing them into an animation. Likewise, the programming guide is generally informative but occasionally obscure. As mentioned earlier, the detailed instructions are geared to Microsoft BASIC.

And the program itself isn't perfect. *Graphics Magician* was originally created for the Apple II. Although Polarware/Penguin programmers Eagle Burns and Roger Lawrence have done a fine job of transferring the program to the Macintosh, it retains that slightly foreign air typical of ported programs. *Graphics Magician* lacks the ease of use for which Mac programs are famed, a problem that is aggravated by the documentation.

I wouldn't recommend *The Graphics Magician* to beginning programmers; interfacing the animation modules to a program requires more than a rudimentary grasp of programming techniques. For creating stand-alone animations I'd recommend Spinnaker/Hayden's *VideoWorks*. For "slide show" presentations or self-running demos I'd enlist another magician, Magnum Software's *Slide Show Magician*. Both of these programs allow nonprogrammers to create presentations that incorporate sound and special effects. But for software developers or at-home programming wizards who want to create animated games, *The Graphics Magician* could prove a good sorcerer's apprentice.
—Dolores Hayes

The Graphics Magician
Polarware/Penguin Software, Inc.
P.O. Box 311
Geneva, IL 60134
800/323-0884 for orders only,
312/232-1984
List price: $49.95



Frames of Reference
The Graphics Magician's *shape editor lets you create an object with up to 20 frames of animation. Here, the program has automatically filled in the animation steps between frame 1 and frame 9.*

Budget Accounting

The most remarkable thing about ***Turbo Maccountant*** may be that a program with so many features can fit on one 400K disk costing only $495. A 512K Mac and a 400K external drive are minimum requirements, but with a Mac Plus and a hard disk, *Turbo Maccountant* performs impressively. The program can handle up to 8000 general ledger accounts (with up to 99 departments), 8000 customers, 8000 vendors, 8000 employees, and up to 5 bank accounts.

Turbo Maccountant's modules—General Ledger (G/L), Accounts Receivable (A/R), Accounts Payable (A/P), and Payroll—are fully integrated. The program distributes all transaction data automatically on posting, and all journals and reports are no

more than a mouse click (or two) away. *Turbo Maccountant* can easily meet the accounting needs of small or medium-sized businesses, and since it can handle multiple companies, the program is great for CPAs and professional bookkeepers.

Power to Spare

You expect any accounting system to give error-free performance, handle transaction input, balance and maintain accounts, and print reports. *Turbo Maccountant* does all that and adds strong reporting capabilities and time-saving features.

The main screen consists of single-click icons that open the journals and other parts of the program. Most icons open up to a standard ledger for entering information, but on many of these ledgers, each line can open to a more detailed form.

For instance, each account line in the Chart of Accounts opens to a form on which you can enter up to ten addresses (see "Multiple Address Codes"). Later you enter appropriate address codes onto transaction ledgers. Suppose, for example, that your business advertises with various magazines and newspapers. You would post all transactions to the advertising expense account, but you could automatically use the multiple address codes to cut checks for the different companies from whom you buy advertising. Customer cards can also accommodate several addresses, and you can add credit limits, billing terms, finance charges, and other information. For vendors you fill in one address and discount terms, if any. And for employees, you can add payroll information, including up to ten different taxes, salary or hourly pay, overtime, fringe benefits, and discretionary payments.

Turbo Maccountant automatically generates invoices, checks, mailing labels, all payroll checks (and associated journal entries), 1099 forms, W-2 forms, and a variety of reports. You can display some reports as graphs—an income statement as a pie chart, for instance. And in most reports you can choose to display data for a single month or a range of months. The program keeps an audit trail in the form of account histories, and you can print out a complete G/L report for whatever period you choose. You cannot view the G/L report on screen, however.

In addition to standard income statements and balance sheets, *Turbo Maccountant* can produce a sales tax, cash-

(continues)

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A word of caution; this game is addictive and the game playing time can vary from an hour to over ten, depending on your skill and fortitude, and of course that of your enemy. Partial games can be saved. Remember, the computer is no slouch, with 15 levels of difficulty and expert intelligence, even the best General will be challenged. SC // has digitized sound, great graphics, and much more. Requires 512K Macintosh **$59.95**

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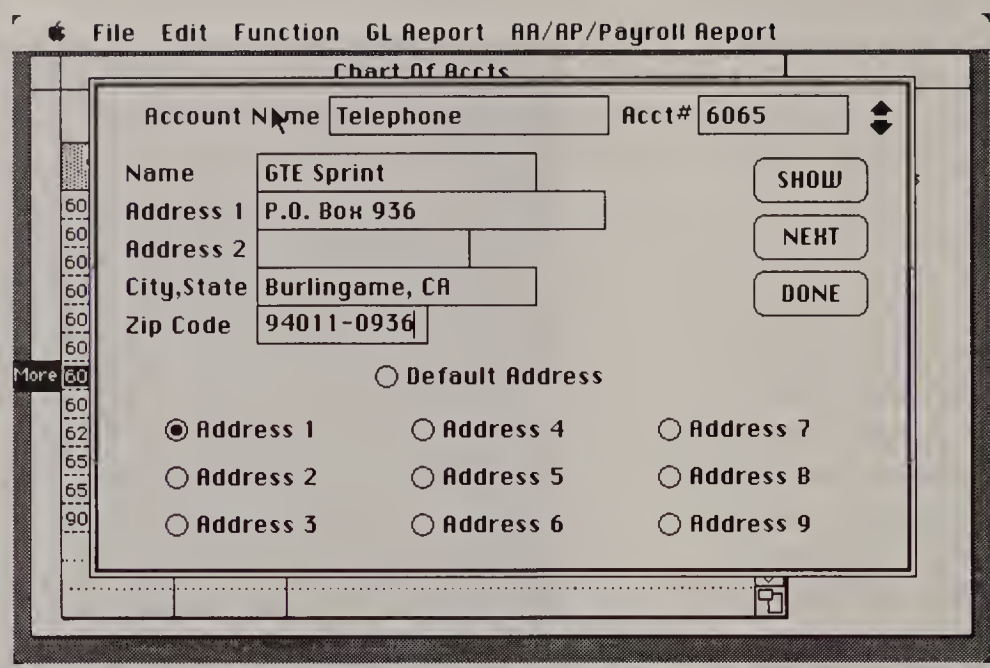
flow analysis, account history, aging for A/R and A/P, vendor and customer analysis, and sales. The program also produces commissions, payroll summaries, a check register, and an invoice register. A financial ratios report produces a long list of very useful financial information, including figures for the current ratio, the net and gross profit margins, the return on assets, and debt to equity.

One of *Turbo Maccountant*'s time-saving features, recurring entries, lets you set transactions for automatic processing at any interval. The program's Find feature enables you to search a ledger for an account number or string value. Two levels of password protection are available, including one that allows data-entry personnel to work on the system but still protects sensitive data, such as account balances. And the program lets you output reports to ASCII, *Jazz,* or SYLK files.

If you use floppy disks with *Turbo Maccountant,* you can extend your data disks indefinitely; the program carries forward information and keeps all reports and accounts—including aged accounts—up-to-date when you start a new disk.

This means that even with floppies the program can handle and keep your accounting information for years. The historical information is always available on earlier disks, and any necessary adjusting entries can still be made on the latest disk.



Multiple Address Codes
Multiple addresses in the general ledger account allow different branch offices to receive billing information.

More Features

You can use as many or as few of *Turbo Maccountant*'s features as you need. Because of this flexibility, setting up the program can be rather complex if you want a system that tracks a lot of customers, vendors, employees, and departments—or it can be quite easy if you use a simpler bookkeeping system.

Since remembering account codes can be difficult, *Turbo Maccountant* offers two shortcuts: if you enter a partial name in the account column of any transactions ledger, the program attempts to match that string. Alternatively, you can open or leave active the Chart of Accounts, Customer,

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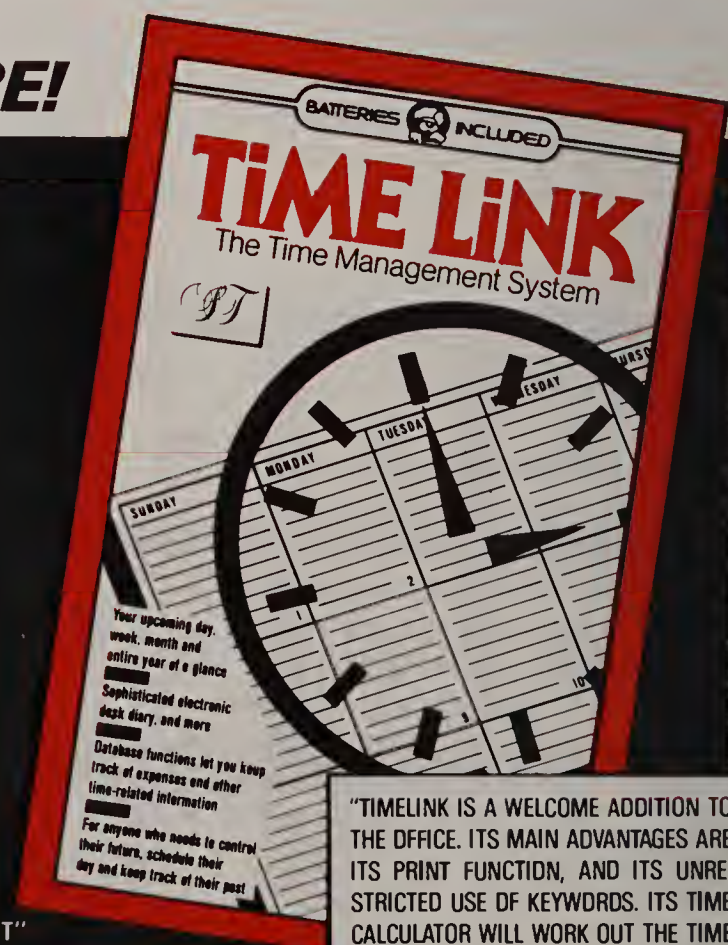

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Vendor, and/or Employee window(s), switch to the desired window, select the G/L, customer, or vendor account you want, and click on the Account to Journal button to fill in the account number and description.

Turbo Maccountant processes all transactions in batches. You see the total for the current batch at the top of the journal. When you close the window, the program posts all transactions and warns you of any errors. Using the batch method, you can actually correct previous entries without having to go through the transaction-reversal process. Only after you process the batch are the transactions posted and fixed in the system.

The manual for *Turbo Maccountant* is full of useful information and gives both a quick overview and a more detailed look at all the program's features. In addition, the program provides an on-screen help index in a special pull-down menu; when you select the index heading you wish to read, the program produces the relevant text. Also available is a somewhat corny but informative video introduction to the program.

Finally, *Turbo Maccountant* includes five definable sales tax codes, automatic invoicing and billing, one-click processing of receivables and payables, application of finance charges, and many other features.

Final Words

I found *Turbo Maccountant* a little confusing at first, mostly because I didn't fully understand the methodology and structure of the program. Once I became familiar with the program's shortcuts and many options, however, I found data entry and analysis logical and smooth. Dates default to current or last entered date; check and invoice numbers automatically increment. To enter a due date in the A/P, say for payment in 30 days, you simply enter +30 in the due date column. The program calculates the date for you. *Turbo Maccountant* keeps a running total when you split a transaction across multiple G/L accounts. In fact, all error-checking is excellent. You can't enter a nonexistent account number, an invalid invoice reference, or an unbalanced transaction. The program even warns you, somewhat imaginatively, if you overpay an outstanding invoice or attempt to apply payment to a closed invoice. My problems with this program were minor ones. Files output to spreadsheets had no descriptive headers, so that although all the information was there, it was difficult to tell what it represented. I also ran into a small problem tracking cash sales for specific customers and vendors: you can only track the transaction if you enter it in the sales or purchases journal and again in the appropriate disbursement or receipt journal. You can create a recurring entry to automate this two-step procedure, however.

The Payroll module requires some discussion. Although it may be adequate for businesses whose employees are paid in a very straightforward manner, it is not a full-featured payroll module. *Turbo Maccountant* does not adequately handle flexible arrangements like multiple commission rates, different hourly pay rates for one employee, or payrolls comprising both hourly and salaried employees. That's the bad news. The good news is that Digital Etc. plans an update of *Turbo Maccountant* with a payroll module that should take care of these and other shortcomings.

(continues)

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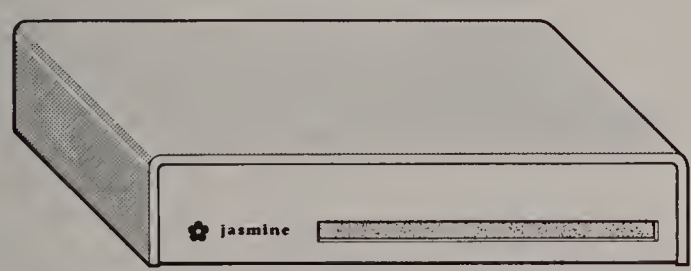

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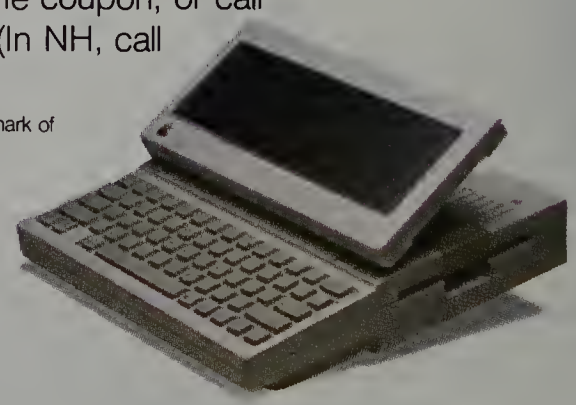

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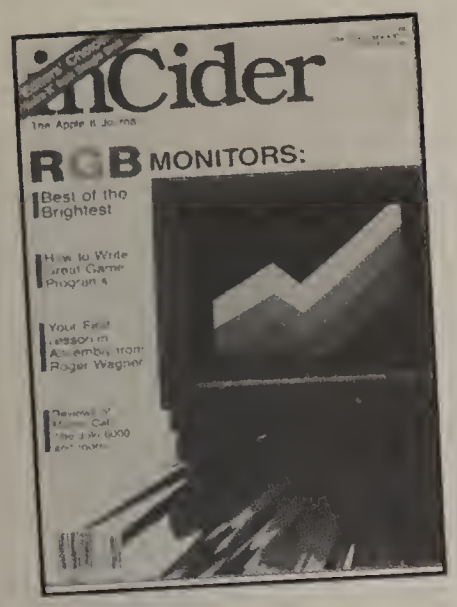

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In the final analysis, *Turbo Maccountant* is a powerful program suitable for small and medium-sized businesses, bookkeepers, and accountants. For very small businesses, some of the excellent one-write systems may be preferable because they offer a shorter learning curve and because small businesses won't need many of *Turbo Maccountant*'s features. For those who want more power, flexibility, and features, however, *Turbo Maccountant* is a sophisticated business tool that's easier to learn and use on a day-to-day basis than many comparable—and more expensive—accounting systems.—*Rusel DeMaria*

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Before you can use *Mac+II,* you must transfer the program code from Apple II ROMs to a file on the *Mac+II* start-up disk. Utility programs are provided to facilitate this process. After starting *Mac+II,* the Mac screen displays 24 lines of 40- or 80-column white text on a black background and simulates low- or high-resolution color graphics with shades of gray. Mac double-sided and single-sided disk drives can then read disks written by an Apple II UniDisk 3.5 and vice versa. *Mac+II* supports the standard ProDOS and Pascal 1.3 Apple II operating systems and includes Meacom's UniDOS operating system. It permits *Mac+II,* or an Apple II, to use the still popular DOS 3.3 operating system, which formerly could not use 3½-inch disks. *Mac+II* does not presently work with any type of hard disk drive.

(continues)

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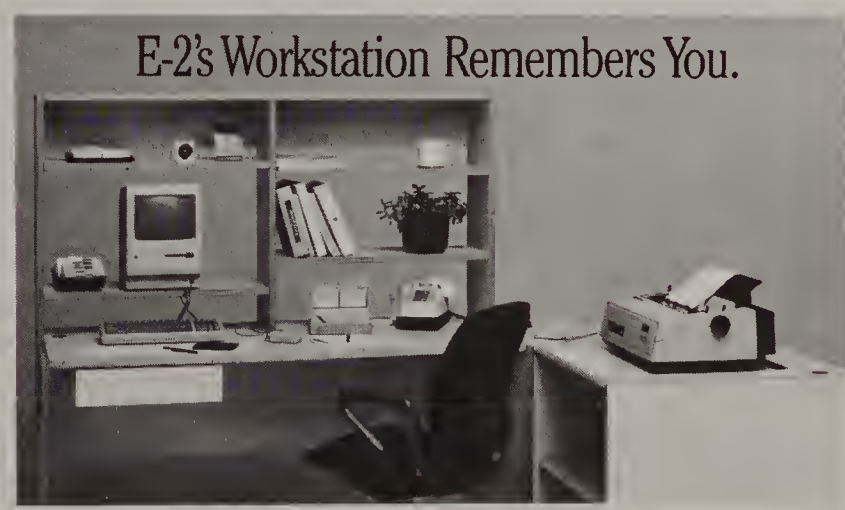

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AppleWorks on the Mac
With Mac+II, *AppleWorks and myriad other Apple II programs do indeed run on a Macintosh, although at a leisurely pace.*

Making the Transfer

Since the Apple II keyboard has several keys not found on the Mac or Mac Plus keyboards, *Mac+II* recognizes combination keystrokes as their equivalents. For example, pressing Clear on a Mac Plus or ⌘-tilde on any Mac is the same as pressing Escape on an Apple II.

The Mac's printer and modem ports partially emulate super serial cards installed in slots #1 and #2, respectively, of an Apple II. The mouse simulates an Apple II joystick or pair of paddles.

Apple II software and data exist mostly on 5¼-inch disks, so they must be copied to 3½-inch disks to be used with *Mac+II* on a Mac. You can either copy the program and data files using an Apple II equipped with both 3½- and 5¼-inch drives, or you can use a program included with *Mac+II,* Mac Com, to transfer them via the serial ports. However, Mac Com is strictly a transfer program and doesn't remove copy protection from applications. Moreover, it only works if the Apple II serial card is installed in slot #2, whereas its most common location is slot #1—a fact not disclosed in the baffling manual. Meacom claims an improved, rewritten manual now tells you where to put the serial card and is more comprehensible throughout.

A Few Quirks

Generally, any program that works from a 3½-inch disk drive on an Apple II also works with *Mac+II,* albeit at one-third its normal speed or slower (see "AppleWorks on the Mac"). Music and sound effects rattle and buzz, the screen appears sluggish, and calculations take longer. In addition, high-resolution graphics do not always function correctly. Objects are too wide for their height—a reverse El Greco effect—and sometimes the screen is not cleared when it should be. At other times, a four-line text area blanks the bottom part of the high-resolution display when it shouldn't. Although these quirks reduce the usefulness of the vast Apple II software library, they don't make Apple II programs worthless. For the most part, only programs originally shipped on 3½-inch disks with elaborate copy-protection schemes flatly refuse to work.

Mac+II author David Hemmo has done an amazing job of faithfully recreating an Apple II on a Macintosh. He probably wishes like the rest of us that the Mac would give up Quaaludes and work faster. In spite of its sluggishness and a few incompatibilities, *Mac+II* is a good compromise for ex-Apple II users who want to move their custom software to the Mac, for Mac users who also use an Apple II (or who work with people who do), and for the Mac user who needs occasional access to an Apple II.—*Lon Poole*

Mac+II, version 3.1
Meacom
P.O. Box 272591
Houston, TX 77277
713/526-5706
List price: $149.95

Reading Between the Lines

Creating software based on other media is a risky business. Many a programmer has floundered when trying to produce a computerized version of a how-to book or a video-game remake of a popular movie. In the case of the Macintosh, there's even a risk in converting programs originally written for other computers. Macintosh users expect programs to look and feel like Macintosh programs, and quick-and-dirty ports often lose something in the translation.

Evelyn Reincarnated

Timeworks' ***Evelyn Wood Dynamic Reader,*** a program based on the famous speed-reading course, has been translated several times: from course to book, from book to IBM PC software, and from IBM to Mac. It's clear that this program wasn't designed with the Mac's user interface in mind. Experienced Mac users will quickly find that the program lacks the intuitive I-know-what-to-do-next feel that's characteristic of good Macintosh software. Although the program has been modified somewhat for the Mac, the manual is primarily aimed at IBM PC owners. Many of the instructions are confusing or misleading, especially for beginners. In some cases, the lack of specific instructions is aggravated by flaws in the software. While initializing a data disk, for example, the program may ask you to insert a disk without first ejecting the one already in the drive.

Once you successfully initialize a data disk, you're ready to work toward your goal: to scan and understand larger and larger groups of words. First, you take a timed reading test. When your baseline reading and comprehension scores are established, you're ready to start a training program using a combination of drills and practice exercises. These include pattern-recognition sessions, during which characters, words, or phrases are displayed at the top of the screen and you select matching items from a list below. At best, the process is awkward: you're instructed to run your finger down the list and select the matching response by hitting a corresponding number key, when clicking answers with the mouse would be more convenient. Another set of exercises asks you to follow a moving dot so your eyes can learn efficient scanning patterns. Unfortunately, the poorly animated dot flickers and even disappears when it's run at faster speeds.

Take a Ride on the Reading

At the heart of the *Evelyn Wood Dynamic Reader* are the reading drills, during which you read articles stored on disk, articles in an accompanying booklet, or text files you load into the program. If you use the on-screen readings or selections from the booklet, the program times your progress and administers a multiple-choice comprehension test when you're done. The program can't test your understanding of passages you supply, but the manual contains instructions for measuring reading speed.

With all its faults, the *Evelyn Wood Dynamic Reader* has several strengths. The program allows a number of students to share the same copy-protected disk, provided that each uses a separate data disk. Students can choose from 20 readings that come with the program, or they can supply their own practice materials. The program tracks each student's speed and comprehension for individual sessions, and displays progress charts and graphs. The manual is full of practical tips on reading various types of material, from books to memos. The manual also clearly explains the theory behind the methods—a theory that is nicely summarized by the subtitle of another speed-reading program, *Smart Eyes: Read Faster, Read Smarter.*

Reading Faster

In fact, Addison-Wesley's ***Smart Eyes*** is built around many of the same concepts as the *Evelyn Wood Dynamic Reader.* But while *Smart Eyes* is also published in several machine formats, the Macintosh version doesn't look at all like a made-over IBM PC program. Like the Evelyn Wood program, *Smart Eyes* includes several exercises designed to increase reading speed. In addition to the moving dot exercise (not as versatile as the Evelyn Wood version, but much more usable), the program presents a number of "calisthenics for the eyes," including Tachy, a word recognition game that helps your eyes move quickly from one spot to another; and Eye Stretch, a pattern-recognition exercise that improves peripheral vision.

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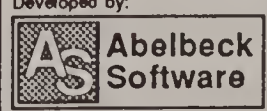

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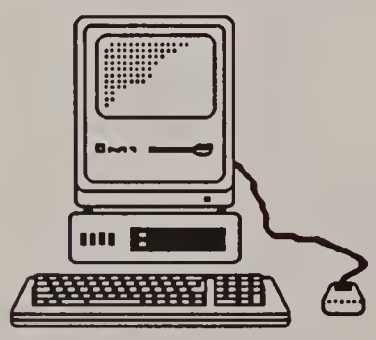

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The program's fixation exercises, which break reading selections into short passages, seem ideal for training lazy eyes to read phrases rather than words. A speed control bar allows you to step up the pace until you must begin to grasp ideas rather than pronounce each word silently. Unfortunately, the passages are based on word count and line length rather than logical connection, so many of the phrases are disjointed.

The forced and paced reading exercises display entire screens of text instead of flashing a few words at a time. In the forced reading exercises, each word or line is highlighted as you proceed through a selection at a specified speed. An option erases lines as you read rather than highlighting them. Paced exercises display text in columns, using a moving bar or a periodic beep to remind you of the pace you must maintain to achieve your selected speed.

At the end of each *Smart Eyes* article, a multiple-choice comprehension test is displayed and scored by the program. Unfortunately, both the articles and the corresponding questions are randomly chosen from very small collections on the disk, giving the student no control over their selection. And since the program's ten articles are reused from session to session, the comprehension tests become almost meaningless.

This random recycling of articles also makes for tedious study sessions. Fortunately, *Smart Eyes* lets you use any Macintosh text file as a forced or paced reading exercise. Of course, a self-supplied passage can't be used to test for comprehension, but it can provide a welcome break from reading a *Smart Eyes* article for the tenth time.

Reading Smarter

Smart Eyes also includes several exercises to help improve your reading comprehension. These include word identification exercises and meaning recognition exercises, both designed to increase comprehension speed. In addition, the program includes cognitive exercises to teach previewing (skimming an entire article to grasp the general theme), analyzing writing structure, and scanning for facts. These exercises are based on tried-and-true approaches to reading, and they're a valuable addition to the program. But like the speed-reading exercises, the comprehension exercises suffer from the limited number of examples provided.

Reading the Results

Although both programs have flaws, with practice, either can be used to increase reading speed and comprehension. I found *Smart Eyes,* with its friendly Mac style and its variety of well-designed exercises, much more pleasant to use than the *Evelyn Wood Dynamic Reader.* And when practice is pleasant, I'm more likely to do it, so *Smart Eyes* is my choice of the two. If the publisher would supply additional reading matter and exercise data, allow students to select from a list of articles, and keep records for multiple users, *Smart Eyes* would be an outstanding educational program.—*George Beekman*

Evelyn Wood Dynamic Reader, version 5.0
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List price: $69.95

Smart Eyes
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Coded Messages

The floppy disks we insert in disk drives and the bar codes on products read at the checkout stand are familiar yet dissimilar forms of data storage. Cauzin Systems has invented a system to distribute software that combines both forms and takes data distribution one step further. Cauzin's ***Softstrip*** reader scans a printed page and encodes the information in binary code onto inch-wide data strips of black-and-white rectangles. An optical scanner reads the binary code and converts it into text format for the computer.

The data strips give developers an alternate method of mass-distributing software at a low cost. The arguments for and against this approach are reminiscent of the debates on the value of distributing information in bar-code format. The technology is effective only if users purchase *Softstrip* readers in sufficient quantity to make it worthwhile for developers to publish their software on data strips.

(continues)

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Ted Benhari is Public Information Officer at Dominican Hospital in Santa Cruz, CA. He is very much into Desktop Publishing. He produces numerous publications for the hospital, including "The Dominigram," a magazine for the general public, "The Scanner," a newsletter for employees, and a catalog promoting various classes at the hospital's Education Center. Ted likes having the ability to digitize three-dimensional objects. **He can go from live action to his newsletter in seconds.** MacVision™ saves him time and money and gives him tremendous creative flexibility in his publishing efforts. If you need to image three-dimensional objects (buildings, displays, people, products, etc. as well as flat art) you will need MacVision.™ It's that simple. And **each MacVision™ package contains valuable coupons** for special discounts on color and black-and-white cameras so you can go from live action to print in seconds. **Save $366 on a Panasonic Camcorder and $85 on a black and white camera.** MacVision™ is available at leading computer dealers everywhere.

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The Scanner

DOMINICAN HOSPITAL EMPLOYEE NEWSLETTER

VOLUME 1, NUMBER 7 AUGUST, 1986

Alphonse Castaneda...Blooming Genius

The gorgeous orchid corsages at the Hospital's Employee Service Award Dinner came not from some South American jungle, but from the carefully tended plants grown locally by **Alphonse Castaneda** the instrument technician in the Surgery Department.

Alphonse has been growing orchids for seven years. Bloomed from a hobby into a part-time vocation, his orchids are in great

to the public.

Orchids' delicate beauty belies their durability. They make great gifts - a cut stem laden with flowers, called a spray, can last for one to two months, Alphonse says.

He grows his plants by cloning them in petri dishes, or combines varieties through hybridization. The work is exacting, as is his delicate adjustments of the sophisticated surgical equipment.

"My job here is to make sure everything used in an operation is working properly," says Alphonse. "It requires great care and

dure if something isn't working as well as it should.

Alphonse's expertise goes beyond mere maintenance. He redesigned a surgical saw used for cutting bone blocks for vertebra fusions. The improvement makes the procedure go a lot faster. Alphonse says with justifiable pride.

Alphonse was a prime mover in organizing the Hospital softball teams, although his schedule doesn't permit him to play this year. The teams boost morale by helping people from different departments get to know each other as people," he says, "not just as functions."

This is very important to Alphonse,

firm, is a real "people person," with a well deserved reputation for kindness and generosity.

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Circle 541 on reader service card

Publishers have been among the first to use the data strips. Pergamon Press, a scientific publisher, and *Library Hi-Tech Journal* print abstracts and indexes on Softstrips, and *Wine and Spirits* magazine publishes a wine database (see "Wine Data"). *Keyboards, Computers & Software* magazine distributes digitized sound patches, and the *Village Voice* plans to publish its personals column in data strips. Some software developers, such as Living Videotext, include product demos on *Softstrip* in their brochures.

Retail stores are using *Softstrip* to develop "smart forms." Rather than repeatedly enter customer and product information at each stage of the order process and risk introducing new data entry errors, the information is encoded onto a Softstrip and applied to the invoice. As the order is processed, the pertinent data is read back into the computer and the progress of the order is monitored throughout.

Whether the cost and time trade-offs make this distribution system worthwhile is debatable. Distributing data in machine-readable printed form costs less than distributing the same information on disks, but only if you're making thousands of copies. Development, advertising, and dealer markup represent the biggest slices of the software selling pie, for manufacturers spend only about $2 a disk, and the density of information per disk has increased from 400K to 800K on double-sided disks.

When it comes to downloading data from strip to disk, what the developer may save in distribution costs, the consumer loses in time. A high-density Cauzin strip holds 3K and takes 2½ minutes to scan. Scanning a 30K to 40K file takes 15 to 20 minutes, and you must be there at all times to reposition the reader and turn the pages.

Inside Softstrip

The $199 *Softstrip* reader looks like a fluorescent desk lamp without the gooseneck stand. The all-plastic tube-shaped exterior is 16½ inches long and about 3 inches in diameter. Inside the tube is an optical data reader, which consists of a series of lenses, an infrared light source, and a photodetector. A small motor pushes the reader along the length of the tube.

The AC-powered *Softstrip* attaches to the Mac's printer or modem ports via an annoyingly short interface cable. When you place the reader over a data strip, the motorized optical-reader head scans the strip. Most strips are published in books, magazines, and booklets. The pages holding the strips don't need to be removed. Although the paper must lie completely flat, creases and folds don't seem to make much difference. Alignment marks—a dot and a line—are printed beside each strip to help you position the reader.

Error Checking

Softstrip checks for data errors during strip scanning, but it isn't foolproof. I encountered one strip in a *Softstrip* ad that was unreadable. Close inspection revealed a small dot—a printing blemish—just big enough that *Softstrip* refused to scan. I found that most other strips read successfully the first time or after a few attempts.

Softstrip reads data strips with the help of an easy-to-use translation program. However, the error messages are not clear, and the manual provides little guidance in correcting errors. Several times I got the message "Reader Failure—Check Power and Cables." The cables were correctly attached, and the reader was exactly in alignment. Through trial and error, I eventually got the reader to scan the strips.

In spite of these shortcomings, the program provides some fine touches: during the scan process, an arrow moves down the side of a picture of a data strip to show the reader's progress. You are reminded when to move from one strip to the next and are prevented from reading strips out of sequence.

The Higher the Density

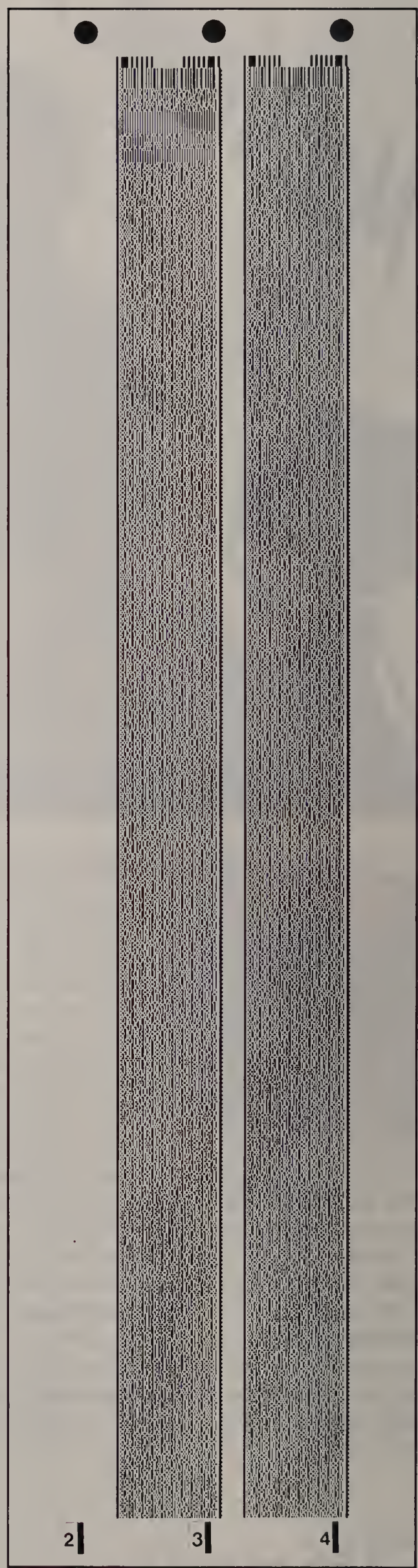
Data can be formatted on the strips in several forms, including MacBinary, used mostly for Macintosh applications, and ASCII text, for documentation and program source listings. Once the data from the strip is received, the program converts it to the proper format automatically. You can save scanned files on any disk.

Softstrips come in three densities: low, medium, and high. Low-density strips can be printed on the Imagewriter using an optional $19.95 utility. A 9½-inch-long low-density strip holds 1075 bytes of data. For testing purposes, I printed the 28K Macin-

(continues)

Wine Data

Wine data supplied by Wine and Spirits *magazine, a consumer magazine that reports on over 1000 wines per issue.*



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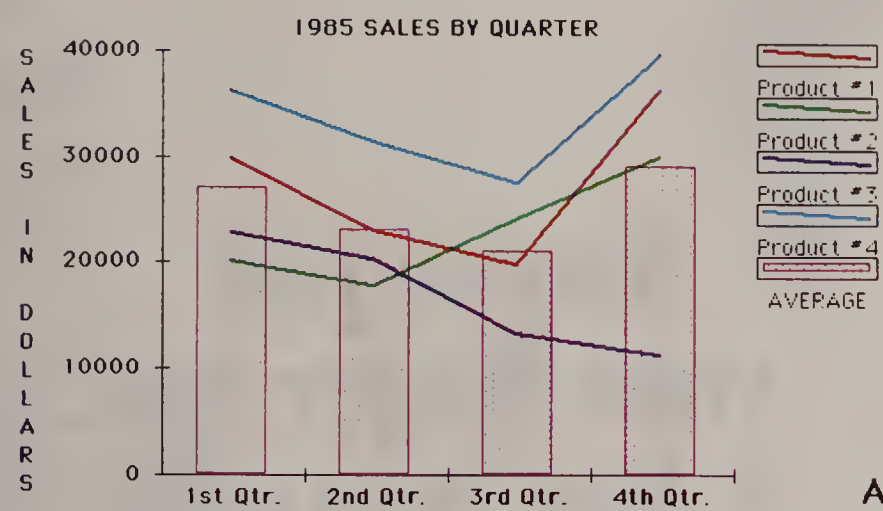

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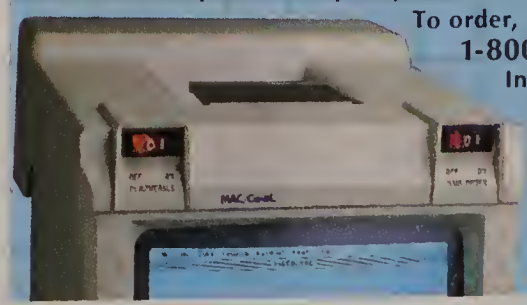

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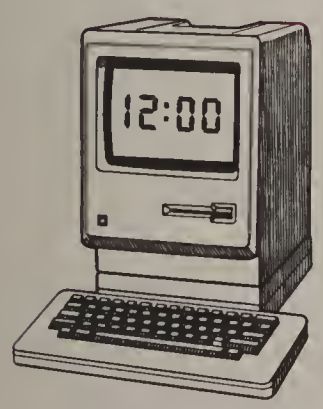

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Talk voice-synthesis system file. The program printed as 29 strips on four pages. Each page took 5½ minutes to print, a total of 22 minutes.

Medium-density strips hold three times as much data, but require a LaserWriter to make them. Cauzin didn't have the laser printer utility available for me to test. Many of the data strips published in Cauzin's ads and in their software libraries are printed in medium density.

High-density strips hold up to 5500 bytes each, but they require a more precise alignment of the reader, and their resolution is too fine even for the LaserWriter. They are available by special order at $20 per strip.

What, No Software?

Softstrip is slow and requires much more work to access programs and data than a floppy disk does. But these are minor problems compared to the dearth of data strips available for the reader. A software sampler comes with *Softstrip,* but the programs are trivial and not too useful. Strips published in Cauzin ads provide more software, but it's the same kind you can get from user groups and companies selling public domain programs.

Cauzin sells a library of strip packages whose retail prices range from $2.98 to $19.98. Several dealers in my area carried the reader but not the software.

Although Cauzin has already published over 2 megabytes of data, sales of *Softstrip* readers have been slow because not many programs are available for them. This results in a Catch-22 situation that makes software developers reluctant to publish programs in strip format until more *Softstrip* readers are sold. Although *Softstrip* has begun to find its niche—as an information supplement, in invoice tracking, and for product demos—it will remain a curio for the gadgeteer until more software comes out.

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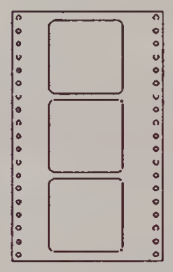

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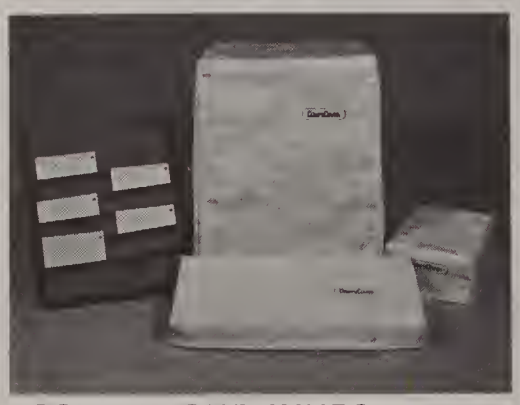

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■ *Expert Systems*

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The Knowledge Integration Toolkit for Building Expert Systems. This shell is written in FORTH as a turnkey application . . . FORTH not required. *MacKIT* features a production rule compiler, back-chaining inference engine, certainty factors. Not copy protected. 512K req. $149, demo disk $10. MC/Visa.
Knowledge System Environments Inc., P.O. Box 261, Dept. M3, Grantham, PA 17027, 717/766-4496

■ *Hardware*

○ *Accessories*

Trackball
The high-speed Trackball and Numeric Keypad Input devices formerly offered by Assimilation continue to be available from the manufacturer, Cambridge Automation. The Numeric Turbo upgrades your 512K/128K keyboard to that of a Mac Plus with the advantage of a Mac Turbo Touch trackball. Also available are the MIDI Conductor and the Mac Port Adaptor.
Cambridge Automation, 20200 State Rd. Cerritos, CA 90701, 800/345-8666, 800/826-9214 in California

○ *Bar Code*

Bar Code/MagCard Readers
The PC-380 Bar Code & PC-580 Magnetic Stripe (credit card) Readers have been designed to interface with the Apple Macintosh, are easily connected between the keyboard and the CPU, and require neither additional software nor an RS-232 port. A powerful but simple program for printing Code 39 bar codes is also available.
TPS Electronics, 4047 Transport St., Palo Alto, CA 94303, 415/856-6833

○ *Data Aquisition*

"Real World" Access
Add measurement and control capabilities to your Mac with the ADC-1. This easy-to-use RS-232 peripheral includes 16 analog inputs (13-bit), 4 digital inputs, 6 outputs, and a BSR controller. Use for laboratory, industrial, and home monitoring. $449. ADControl software $45. Sensors available.
Remote Measurement Systems, 2633 Eastlake Ave. #200, Seattle, WA 98102, 206/328-2255

○ *Memory Upgrade*

Memory Enhancements
Upgrade your Mac to 512K, 1024K, or 2048K of contiguous memory. SCSI port & fans available. Factory flow-solder techniques used for high reliability. 120-day warranty. Local 20-minute installation or mail order.

Dealer inquiries welcome. Call for pricing and information.
Ehman Engineering, 115 Apache Dr., Evanston, WY 82930, 800/257-1666

NEW Product!
Offer good through 10/86. 4-megabyte RAM installation in your 128K or 512K Macintosh with full warranty for UNDER $1500. 1 & 2 megabytes also available. Includes fan & additional power supply. Local or mail-order installation. Available now! MC/Visa accepted. Other new products coming. Dealer inquiries welcome.
Julian Systems, Inc., 4345 Fairwood Dr., Concord, CA 94521, 415/686-4400, 800/447-2300 in California

○ *Video*

MacMonitors/Projectors
17- & 23-inch hi-res monochrome monitors w/ antiglare, white phosphor, vari-scan. When your Mac must be seen in the classroom, trade show, office, etc. Only $1095 & $1295. Projector Systems w/ white phosphor, hi-gain screen, stand, cables. A complete system for the ultimate in Mac viewing pleasure. Only $5295. Dealer inquiries welcome.
National Data Systems, 2419 Rutland Dr., Austin, TX 78758, 512/837-1760, 800/531-5143, 800/252-8286 in Texas

Mentauris Corp.
Specialists in Macintosh video interfacing for over two years. Mentauris offers a wide range of products to satisfy any Mac or Mac Plus video interfacing need: our original, high-res Composite Video Adapter; our new, "no-drill" CVA; monochrome and color NTSC scan converters; Mac disassembly hand tools.
Mentauris Corp., 1658 IH 35 S, P.O. Box 1467, San Marcos, TX 78666, 512/396-1565

■ *Insurance*

Safeware
If your computer is important to you, insure it! SAFEWARE provides full replacement of hardware, media, & purchased software. As little as $39 a year covers fire, theft, power surges, earthquake, water damage, auto accident. Call 8 a.m. to 8 p.m. Mon. thru Fri.; Sat. 9 a.m. to 5 p.m.
Safeware, The Insurance Agency Inc., 2929 N. High St., P.O. Box 02211, Columbus, OH 43202, 800/848-3469, 614/262-0559 in Ohio

■ *Publications*

Microcomputer Books
- *Mac Midnight Madness* $17.95
- *Mac Spreadsheets: Using Microsoft Multiplan, Chart & File* $15.95
- *Microsoft File* $17.95
- *Microsoft Macinations* $18.95
- *Planning Big with MacProject* $15.95
- *Presentation Graphics on the Apple Mac* $17.95
- *The Printed Word* $16.95

MC/Visa/AE. FREE Directory.
Micro Books, P.O. Box 4068, West Richland, WA 99352, 800/547-9755 ext. 8, 509/967-5084 in Washington

Mac Tricks
Only $14.95 postpaid, a handbook of hundreds of helpful tips to make your Mac more useful, fast, and fun. If you read ALL of the magazines, you've seen many, if you could only remember where?! Full table of contents and index, information arranged by application. Probably the best $15 you'll ever spend on your Mac. MC/Visa accepted.
Digi-Graphics, 764 E. Village Way, Kaysville, UT 84037, 801/544-2009

■ *Services*

○ *Data Conversion*

Electronic Data Conversion
Conveniently translate data files from mainframes, minis, dedicated word processors, typesetters, & PCs (word processing embedded codes, database structures & spreadsheet reports & formulas) to Mac or almost any system. Ultimate technology. Nation's leading firms use our invaluable services!
CompuData Translators, Inc., 6565 Sunset Blvd. #301, Hollywood, CA 90028, 213/462-6222

○ *Graphics/Printing*

Laser Typesetting
Use your Mac for desktop publishing! Newsletters, brochures, and other graphics output at professional quality using your Mac and our Linotype™ typesetter or Apple LaserWriter. Great savings and 24-hour turnaround via disk or modem. Graphic design also available from our staff artists. Write or call:
Spectrum Arts, Ltd., 1823 Eutaw Pl., Baltimore, MD 21217, 301/225-7372

○ *Publishing*

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Laser Printing Services, 26058 W. 12-Mile Rd., Southfield, MI 48034, 313/356-1004

■ *Software*

○ *Accounting*

P•O•S/Mac
Point-of-sale software. Includes:
- Invoicing w/ multipayment types, sales tax, & credit/debit tracking
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- Accounts Receivable with credit limit, auto discount, tax exemption
- Price quotes • Full reporting
- Multiuser–$995.

Software Complement, P.O. Box 1123, Milford, PA 18337, 717/686-5592

Time-Saver Payroll System
Calculate salaried & hourly wages, state, federal tax & FICA. Many other optional deductions provided for in the system. *Accumulates* employee wages & deductions for year-end W2 reporting. *Creates* req. monthly & quarterly state & federal tax reports. *Easy to Use!* Req. *Excel.* $35. MC/Visa/Chk.
Western Software Assoc., 110 El Dorado Rd., Walnut Creek, CA 94595, 415/935-3673

○ *Apple Emulator*

II in a Mac™ Version 2.0
AT LAST!... Run Apple II +/e/c software on your Macintosh, easily and without modification! *II in a Mac* INCLUDES DOS 3.3, ProDOS, Integer/Applesoft BASIC, transfer software, & supports:
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Computer:applications Inc., 12813 Lindley Dr., Raleigh, NC 27614, 919/846-1411

○ *Architecture*

MacPerspective™
Allows architects, draftspeople, and artists to rapidly construct perspective drawings of houses, buildings, or other objects. Viewpoint can easily be changed. Drawings can be printed in any size up to 100 inches. Easy to learn and use. Fast, professional program with many features, thorough manual. $149.
B. Knick Drafting, 313 Marlin Pl., Melbourne Beach, FL 32951, 305/727-8071

○ *Backup/Restore*

HFS Backup™
Program to "back up" (archive) data from hard disks. The entire disk, selected files, or all changes since the last backup may be saved or restored. A backup template may be created. Program is optimized for efficient use of both user time and backup space. Files may be viewed hierarchically by folder or alphabetically by file. $39.95. MC/Visa or at your dealer.
Personal Computer Peripherals Corp., 6204 Benjamin Rd., Tampa, FL 33614

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This no-nonsense HFS-compatible backup utility is powerful and easy to use. *MacLibrarian* backs up, catalogs, & restores valuable disks, folders, & files.
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◯ Billing

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Applied Micronetics, 3 Burnt Oak Circle, Lafayette, CA 94549, 415/283-4498

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Create on-line forms with *MacFill-In.* Fill in blanks manually by typing or automatically with date, time, or other defaults, or computed values. File forms on disk, or print if paper is required. Includes 18 standard forms that you can customize, or create your own. Requires 512K Mac $39. Check/MC/Visa OK.
Cognitive Concepts, 1219 Phelps Ave., San Jose, CA 95117, 408/243-6886

◯ Data Acquisition

Macontrol–IDAC/1000

Macontrol, a $695 software package that makes data acquisition + control as simple as using a spreadsheet (*Excel* or *Multiplan*). The IDAC/1000, a new high-performance $995 data acquisition peripheral–8 analog inputs (3600 samples/sec), 16 digital points, 19.2KB serial port connection with pass-thru port.
International Data Acquisition + Control, Inc., 4 Limbo Ln., P.O. Box 387, Amherst, NH 03031, 603/673-0765

◯ Desk Accessories

Calculator Construction

Design/Build your own calc desk accessories with our MacPaint-like application (no programming required). Stretch & decorate calc shell, custom map keys, built-in macros, scrolling tape prints to disk or ImageWriter. Version 2.0 emulates HP 12C-41C. Calcs install using Font/DA Mover. Just $59 (+ s/h CA tax). Visa/MC.
Dubl-Click Software, Inc., 18201 Gresham St., Northbridge, CA 91325, 818/349-2758

◯ Educational

Gradebook/Test Generator

MICROGRADE–Easy course & grade setup, large class size & 100 assignments. Prints stats and various reports–optional SCANTRON interface for auto grade entry.
MICROTEST II–Creates, updates, generates, & stores exam materials. Easy question entry, large database, multiple test versions. Free brochures–$5 demos.
Chariot Software Group, 3659 India St., Ste. MD, San Diego, CA 92103, 619/298-0202

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Medina Software, Inc., 2008 Las Palmas Circle, Orlando, FL 32822, 305/281-1557

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measure*UP*™ is a revolutionary new personnel testing system. Uniquely combining *graphics*, word processing, and database management, measure*UP* enables you to develop personnel tests more easily and better than ever–*we guarantee it!* Call today and learn how measure*UP* can dramatically improve your testing program!
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◯ Engineering

Digital Logic Design Aid

LogiWorks is an interactive digital logic drawing and simulation package for the Macintosh. Features:
• built-in library of common gates, flip-flops, etc.
• user-defined devices, PROMs and PLAs
• adjustable device delays
• 3-state and open-collector devices
• produces timing diagram of selected signals
• $159.95 (U.S.) • 128K version (no user-defined devices) $79.95 (U.S.)
Capilano Computing, 548 Beatty St., Vancouver, B.C. V6B 2L3 Canada, 604/669-6343

Structural

Analysis & design programs. Any # of nodes, elements, loads. Structure, load, tension, shear, moment & deflected shape diagrams, in & out text, section table, more. Full mac interface. FRAME-MAC (2-D frames) $495; BEAMAC II (continuous beams) $295; BEAMAC (simple beams) $95. $-back guarantee. Free support.
Erez Anzel, 5800 Arlington Ave. #5T, Riverdale, NY 10471, 212/884-5798

◯ Financial

MacMoney™

Gain control of your finances with this record keeper & financial planner designed for the Macintosh™ with your needs in mind. Easy transaction entry. Print checks, multiple reports, & graphs. Transfer data to a text file for extra benefits from *Excel*™ or other programs. Introductory price $74.95 + s/h. Req. 512K.
Survivor Software Ltd./w, 11222 La Cienega Blvd. #450, Inglewood, CA 90304, 213/410-9527

◯ Fonts

Downloadable Laser Fonts

Specialized fonts for the LaserWriter. Classical Greek (SMK™ or WSU format) $85. Serif/sans-serif for scientific texts $75. Font of 100 chemical structures $125 (with scientific text fonts $160). Polish serif or sans-serif $85 each (4 styles). Soon: small caps and modern Greek. MC/Visa. As mentioned in July '86 issue.
Allotype Typographics, 1600 Packard Rd. #5, Ann Arbor, MI 48104, 313/663-1989

Laser Perfect/Custom Fonts

We want fine typography for the Mac. Our downloadable fonts were designed especially for LaserWriter/Linotronic printers & put others to shame: good fit, kerned letters, old-style numerals, thin/em space; *MacSlab* (square-serif) & *MacSans* (sans-serif), with ital, bold, bold ital $95 each. *LaserHebrew*, $145. Next: Devanagari, Bembo. Custom characters/fonts. MC/Visa.
NeoScribe International, P.O. Box 6533-MD, Hamden, CT 06517, 203/782-2200

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Dubl-Click Software, Inc. 18201 Gresham St., Northbridge, CA 91325, 818/349-2758

◯ Games

Dungeon Explorer

This AD&D character generator accounts for race, class (multiclass), HPs, thieving, and sex adjustments; determines psionic capability, secondary skills, wealth, physical characteristics, etc. (requires MBASIC 2.0 or later). Also includes DM critical and fumble hit charts and more. $25 includes s/h. Check or MO to:
Conic Software, 10935 Bodega Hwy., Sebastapol, CA 95472, 707/823-3885

◯ Genealogy

MacGene™

Ideal for beginners and advanced users, the program was designed specifically for the Macintosh. One menu bar gives you complete control over data entry, search, select, list, and chart. Displays include Descendant, Pedigree, Family Group, Birthday, Surname. Supports user-defined fields, tailored reporting, linked files, etc. Exchange data w/ genealogist across town or across the world. Compatible w/ *MacWrite, Microsoft File,* etc. $145.
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○ Graphics

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- Borders

Sgl. disks $39.95. Full library $250. Sampler $49.95. $3 s/h. Other disks.
CompuCRAFT, P.O. Box 3155, Englewood, CO 80155, 303/850-7472

Magic Slate–Version 2.0

A dynamic graphics program that brings to the Mac environment an exciting art medium stimulating untapped artistic talent. Slate provides features typically found in expensive systems. Since you have a state-of-the-art computer, it makes sense to support it with similar software that opens the door to a fulfilling new personal experience.
Devionics, P.O. Box 2126, Covina, CA 91722, 714/779-7193

MGMStation

by Micro CAD/CAM, Inc., is a high-powered, easy-to-use CAD program for the Mac, similar in performance to *AutoCAD* for the IBM PC. *MGMStation* boasts over 140 powerful functions, including XY coordinate, polar, or digital data input; 100× zoom; accuracy to 4 decimals; & much more! Demo disk &/or VCR tape available. $799.
CompServCo., 800 Freedom Ln., Slidell, LA 70458, 800/272-5533, 504/649-0484

EZ-Draft™ Software

Now you can have mainframe CAD power at a fraction of the usual cost! EZ-Draft is a full-feature professional drafting system for the Macintosh™ Plus. Ideal for the casual user. Lets the expert outdraw any other PC drafting system available. Perfect for any kind of drawing. A surefire way to boost profits.
Bridgeport Machines, P.O. Box 32, Bridgeport, CT 06606, 800/242-2404

MacPlot & MacCAD

MacPlot by Microspot is a powerful plotter driver that will plot any object-oriented graphics produced on the Mac in up to 30 colors/pens. Supports over 45 plotters. MacCAD is a series of 12 separate architectural & engineering template libraries for use with either *MacDraw* or *MacDraft* (specify which).
CompServCo., 800 Freedom Ln., Slidell, LA 70458, 800/272-5533, 504/649-0484

○ Languages

Pascal Extender/C Extender

Compiled library routines provide fast, flexible, modifiable Mac interface (windows, menus, scrolling, etc.) PLUS graphics printing, text editing, zooming, picture "grabber." 220-pg. manual, demos. Mac Pascal 2.0, TML Pascal versions: $89.95. Megamax, Aztec C versions: $129.95. Consulair, Lightspeed C: call.
Inventions Software Corp., P.O. Box 3168, Ann Arbor, MI 48106, 313/996-8108

Multitasking for the Mac

Mach1™, a multitasking FORTH83 development system, is THE language for interactive Mac programming: COMPLETE toolbox access, MDS-format assembler, unlimited terminal/background tasks, FAST execution, text files, clickable applications (no lic.), *Switcher*/Edit, 400-p. manual. $99.95 (+s/h, CA tax). MC/Visa.
Palo Alto Shipping Company, P.O. Box 7430, Menlo Park, CA 94026, 415/854-7994, 800/44FORTH

MacScheme™–A Mac Lisp

A LISP environment that makes a Mac feel like a LISP machine. MacScheme™ features a fast, reliable byte code interpreter, debugger, trace facility, and QuickDraw graphics. Its Smalltalk-like interface offers multiple windows and an editor that understands LISP syntax. Supports HFS, 512K or more RAM. $125.
Semantic Microsystems, 4470 S.W. Hall St. #340, Beaverton, OR 97005, 503/643-4539

○ Printer Drivers

The Print-Link™

A printer driver program, complete w/ cable, allowing choice of dot matrix, daisy wheel, & ink jet printers for the Mac. Mfg.'s supported are Apple, Brother, C. Itoh, Citizen, Comrex, Diablo, Dynex, Epson, Infoscribe, Juki, Okidata, Panasonic, Qume, Siemens, & more. $84.95.
GDT Softworks Inc., P.O. Box 1865, Point Roberts, WA 98281-1865, 604/291-9121 or *800/663-MACC (6222)*

○ Public Domain

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Educomp, 2431 Oxford St., Cardiff, CA 92007, 619/942-3838

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PD Mac, Dept. V, P.O. Box 5626, Sherman Oaks, CA 91423

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Hundreds of public domain and shareware programs available for $5/disk ppd USA; no membership fees. Monthly newsletter reviews public-domain and commercial software and technical issues of interest to Mac users: $14/yr. subscription. Send for free sample issue and disk catalog.
MacKey Mouse Club, P.O. Box 4561, Lincoln, NE 68504, 402/466-0252

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Translatum International, 1730 E. Oltorf St. #127, Austin, TX 78741, 512/442-0266

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The Mac Group, P.O. Box 85152, MB231, San Diego, CA 92138

○ Publishing

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A library of "publishing-quality" graphics in *MacDraw* files. More than 150 images in the categories of Publishing, Clip Art, 3-D/CAD, Drafting, Cartoons, & Drawings. *DrawArt™* is "Smart-Art." Customize sizes, scales, patterns, borders & still retain image quality using ImageWriter or LaserWriter. Req. *MacDraw* & 512K. Save $10; order from us. List $49.95. Special $39.95. Visa/MC.
Desktop Graphics, 400 Country Dr., Ste. H, Dover, DE 19901, 302/736-9098

○ Real Estate

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Comprehensive program for managing residential and commercial properties. Many management reports including: operating statement, delinquent rent, lease expiration, and transaction register. Provides check writing, check reconciliation, posting late fees, recurring expenses–$395. Investment analysis–$245.
Yardi Systems, 3324 State St. Ste. O, Santa Barbara, CA 93105, 805/687-4245

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Free demo disk.
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EnterSet, Inc., 410 Townsend St., San Francisco, CA 94107, 415/543-7644

○ *Statistics*

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Integrated, menu-driven, Mac statistical system including: Multiple and stepwise regression, t-tests, correlation, scatter plots, up to 4-way ANOVA, principal components, cross tabulation, transformation, nonparametrics and much more. Complete Mac interface. Transfer data to/from clipboard. $79. Requires 2dd.
NCSS-Mac, 865 E. 400 N., Kaysville, UT 84037, 801/546-0445

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Professional but easy-to-use, SUPERFAST statistical package. Unlimited size of data files. Incl. two flexible data editors (can access *Multiplan* & other files), descriptive stats, t-tests, correlations, cross-tabulation, nonparametric stats, general multifactor ANOVA/ANCOVA, multiple regression, charts, plots, and more. $119. Req. 128K, 1dd.
Statsoft, 2832 E. Tenth St. #4, Tulsa, OK 74104, 918/583-4149

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Analysis of variance program that can compute up to a 10-way design with repeated measures and unequal *n*. Marginal means, plots of interactions, simple effects, range tests, contrasts, and more. Full Mac interface. Two data editors provided. Can read text files w/entries separated by spaces, commas, or tabs. $75 + $3 s/h.
Clear Lake Research, 5615 Morningside #127, Houston, TX 77005, 800/835-2246 ext. 199, 800/362-2421 ext. 199 in Kansas

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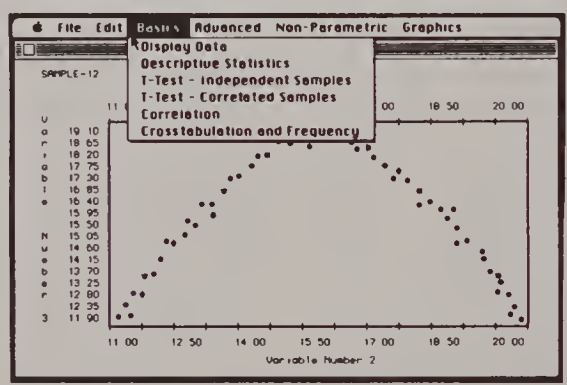

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Circle 353 on reader service card

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Introducing the all new Keeper™ Plus.

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All it takes is a connection.

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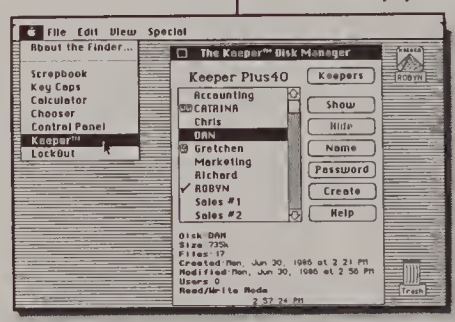

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Typical network setup using two Keeper Pluses.

Circle 551 on reader service card

Open Window

A quicker shortcut for printing copies of MacPaint documents, Word formatting and bibliographies, and more tips from readers

Edited by Jim Heid

This month's tips include an undocumented Microsoft BASIC feature, advice on how not to illuminate your work space, and three Excel *function macros for scientists and statisticians. Also,* Word *formatting tips, using* MacTracks *or* Tempo *to print multiple copies of* MacPaint *documents, and a technique for teaming* Microsoft File *with* Word *to create bibliographies.*

Closing Buttons and Edit Fields

I recently found two useful, undocumented features in Microsoft BASIC version 2.1. When using the CLOSE statement to remove edit fields and buttons from the screen, you can use an argument of zero to clear all the fields or buttons instead of clearing them one by one. The statement EDIT FIELD CLOSE 0 removes all edit fields, while BUTTON CLOSE 0 clears all buttons.

Allan Aoyama
Prince George, British Columbia
Canada

Illuminating Disk Problems

While arranging my real desk top, I put a high-intensity desk lamp—the kind with the transformer in its base—on top of my external disk drive. Shortly thereafter I noticed that the external drive wasn't working. After some disk switching and head scratching, I realized that the transformer in the lamp was interfering with the external drive. Moving the lamp solved the problem.

Jack B. Friend
Salt Lake City, Utah

To shed some more light on external drive problems: don't place the drive to the left of the Mac, either. The magnetic fields generated by the Mac's power supply cause disk errors. In fact, it's a good idea to keep disks and drives away from anything that generates magnetic fields—motors, loudspeakers, power supplies, and of course, magnets.—Ed.

Factorials, Binomials, and Poisson

As a scientist, I use *Excel* to perform some statistical analyses. However, *Excel* lacks some number-crunching functions I need. I've written three *Excel* function macros that scientists, statisticians, and students will find useful (see "Excel Macros")

The factorial macro calculates the factorial of a number (for example, the factorial of 5 is $5 \times 4 \times 3 \times 2 \times 1 = 120$). I use this function to calculate combinations and permutations; it's also called by the other two macros. The factorial macro takes into account that the factorial of 0 is 1 by definition. If you try to calculate the factorial of a number larger than 170, the cell will display the error message #NUM! because the factorial of 171 is a very big number—larger than *Excel* can handle.

The binomial macro calculates the binomial probability of x successes in T inde-

(continues)

File Edit Formula Format Data Options Macro Window

A16 ='OW 3.10 - Excel Macros'!factorial(T)/('OW 3.10 - Excel Macros'!factorial(x)*'OW 3.10 - Excel Macros'!factorial(T-x))

	A	
1	factorial	
2	=ARGUMENT("n")	n = the number whose factorial you want to calculate.
3	=SET.NAME("total",n)	
4	=IF((n=0),RETURN(1))	The factorial of 0 is 1 by definition.
5	=IF((n=1),GOTO(A10))	The factorial of 1 is 1.
6	=SET.NAME("n",n-1)	
7	=total*n	
8	=SET.NAME("total",DEREF(A7))	
9	=GOTO(A5)	NOTE: Excel cannot calculate the factorial of a number larger
10	=RETURN(total)	than 170.
11		
12	binomial	
13	=ARGUMENT("T")	T = the total number of independent trials.
14	=ARGUMENT("x")	x = the number of "successes."
15	=ARGUMENT("p")	p = the probability of "success" in a single trial.
16	='OW 3.10 - Excel Macros'!factorial(T	
17	=(p^x)*((1-p)^(T-x))	
18	=A16*A17	
19	=RETURN(A18)	
20		

20		
21	Poisson	
22	=ARGUMENT("mu")	mu = the mean number of Poisson events.
23	=ARGUMENT("x")	xx = the number of events.
24	=(EXP(-mu)*(mu^x))/'OW 3.10 - Exce	
25	=RETURN(A24)	
26		

Excel Macros
These three Excel *macros provide number-crunching functions needed by scientists and statisticians. The first calculates the factorial of a number. The second calculates binomial probability. The third calculates the probability of x Poisson events in a given period of time with mean number of events mu (μ).*

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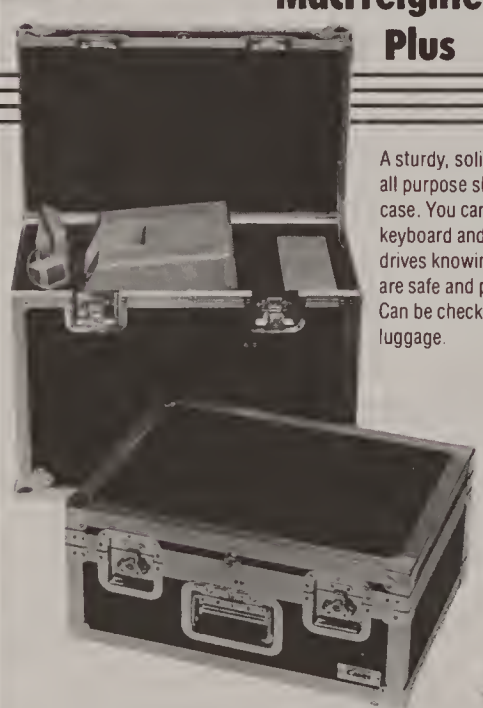

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pendent trials of an experiment, with the probability of success in a single trial, *p*, constant for each trial. The Poisson macro calculates the probability of *x* Poisson events in a given period of time with mean number of events mu (μ).

George Maldonado
Pasadena, California

Formatting with Glossaries

I frequently process long *Microsoft Word* documents containing several paragraph formats and use *Word*'s Glossary to quickly change formats. You can copy paragraph formats and store them in the Glossary either temporarily or permanently.

- Format a paragraph and end the paragraph by pressing the Return key.
- Select the paragraph mark that appears at the end of the formatted paragraph and copy it to the Clipboard. (Choose Show ¶ from the Edit menu to make the marks visible.) A paragraph mark holds the format for that paragraph (see "Storing Formats").
- Open the Glossary window, type a name for the new entry (I use single-digit numbers), and paste the paragraph mark.

Retrieve the format by typing its Glossary name and then pressing ⌘-Backspace. The cursor moves down one line. Finally, position the blinking insertion point just before the new paragraph mark and type.

Barbara S. Meek
Tucson, Arizona

I suspect many Word *users aren't aware of the thousand-and-one uses of paragraph markers. You can, for example, search for and replace paragraph formats using the Change command. First, copy the paragraph marker with the new format to the Clipboard. Next, search for paragraph markers by typing ^p in the Find What box. Each time* Word *finds a paragraph symbol, you can replace it with the one on the Clipboard by pasting. (See* Open Window, Macworld, *August 1986.)*

Don't forget Word's *other formatting shortcut: to change the font or style of some text to match that of existing text, select the text to be changed; then move the cursor to the text whose font or style you want and click while holding the Option and ⌘ keys.*

And one more shortcut: you need not choose Show ¶ before copying a paragraph marker. Simply double-click anywhere to the right of the end of a paragraph.—Ed.

More Word Batch Printing

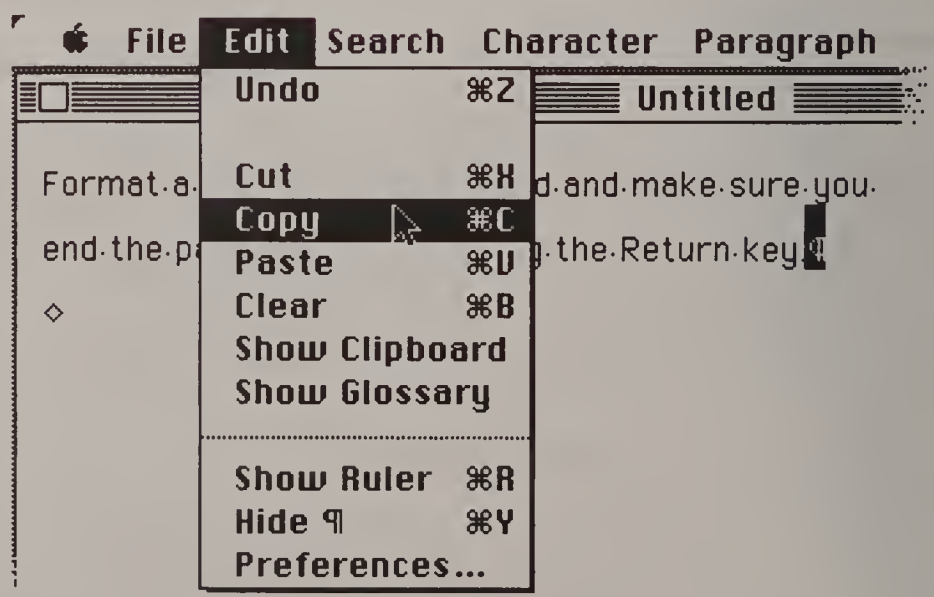
Many thanks to Michael B. Rumelt for his useful tip on printing several *Word* documents at once (see *Open Window, Macworld,* June 1986). I've come up with some additional insights into his technique.

First, the Hierarchical File System (HFS) imposes new guidelines for where you store documents to be merged. Under the HFS, *Word* does not find a document you want to print, displaying the message "Not a valid Word document," unless certain conditions are met. If the Include document (the document containing the «include» statements) hasn't been saved, *Word* finds only open documents and documents in the same folder as the *Word* program. If the Include document has been

(continues)

Storing Formats

With Microsoft Word, *you can store paragraph formats in the Glossary for later recall. First, select the paragraph mark and copy it to the Clipboard. Next, open the Glossary window, type a name for the new entry, and paste. Retrieve the marker and its format by typing its Glossary name, then pressing ⌘-Backspace.*



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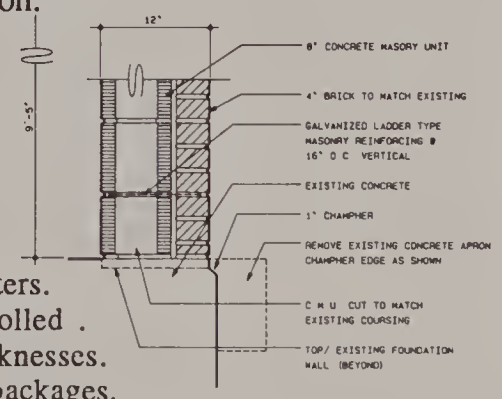

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saved, *Word* finds only open documents and documents in the same folder as the Include document.

Second, if the documents you want to print have division marks (a series of colons) at the end, as do most formatted *Word* documents, page breaks will automatically be inserted between documents. In such cases, using page breaks between «include» statements, as Rumelt prescribes, adds a blank page between documents. Moreover, pressing Return between «include» statements adds a blank line at the beginning of the second and all subsequent documents. In short, use page breaks after «include» statements only for documents lacking division marks; for documents containing division marks, type «include» statements with no breaks of any kind, for example, «include document 1»«include document 2»«include document 3».

Harry S. Silverstein
Spokane, Washington

Multiple MacPaint Prints Revisited

A recent *Open Window* tip told how to print multiple copies of a *MacPaint* document by duplicating it and then using the Finder's Print command to print all the copies (see *Open Window, Macworld,* May 1986). Making all those duplicates takes time, but I found the technique useful—until I needed to print several hundred copies of a 22K invitation and couldn't begin to fit enough copies on a disk.

My solution: create a macro with Assimilation's *MacTracks* to print the same document repeatedly. To use this technique, install *MacTracks* on your *MacPaint* system disk and then create a macro that prints a *MacPaint* document. Next, make another macro that repeats the first one five times and another that repeats the second one five times. Now you can print 25 copies of any *MacPaint* document with just one keystroke. You can use any combination of repetitions that works for you; you can change the total at any time just by changing a macro or adding a new one. With *MacTracks,* be sure to use the Record w/o Doing option while creating the macros so you don't have to wait while you print all those copies.

Lynn Yaeger
Palo Alto, California

Tempo *makes an ideal* MacPaint *multiplier, too. To print a specific number of copies, use its Loop For option, specifying the number of times you want the macro to repeat. If you're using the LaserWriter, you can print an entire paper tray's worth of copies by using the Loop Until command with the Always option so that the macro repeats until you run out of paper.*

There's another way to print multiple MacPaint *documents: the* FastPrint *utility.* FastPrint *provides Page Setup and Print dialog boxes that let you specify the number of copies and whether or not to enlarge or reduce. In addition, it accelerates the printing of documents that contain a great deal of blank space. On MAUG,* FastPrint *is stored as FSTPRT.BIN in data library 1 (Software). It is also available through user groups.—Ed.*

Filing the Words

As a college professor, I use *Microsoft File* to organize data and *Word* to write up my research. *File* is ideal for storing and sorting bibliographic data, but because it can't print the data in the customary form, I've

(continues)

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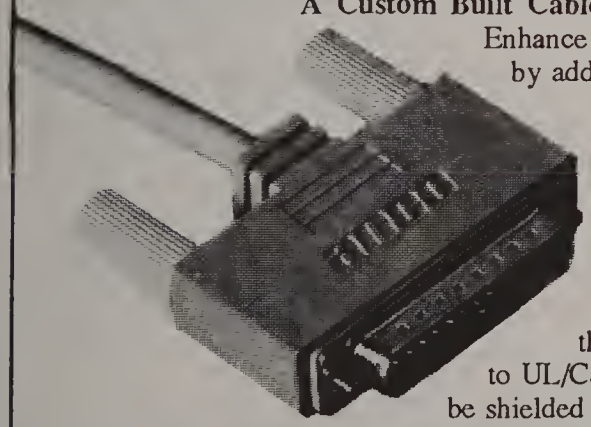

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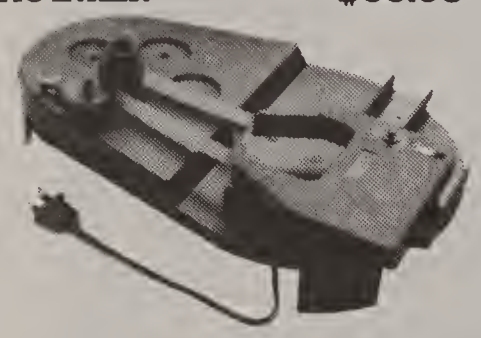

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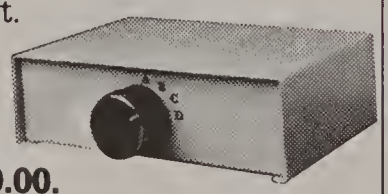

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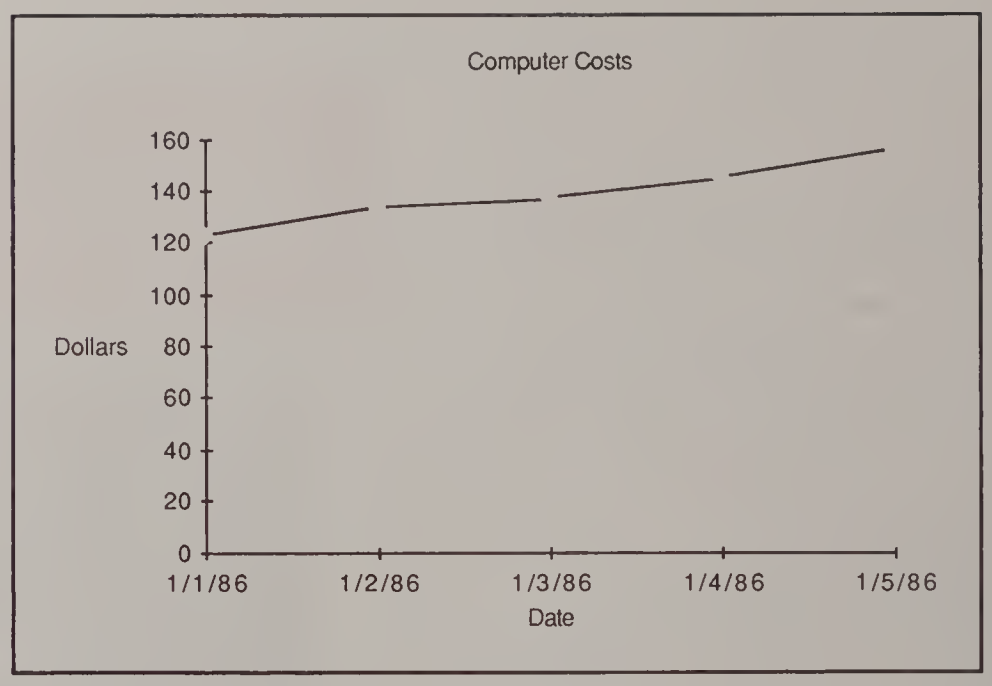

Missing Markers
Note the missing symbol markers. A bug in the first version of the LaserWriter driver prevents data item markers from printing in charts created by Microsoft Chart. *To remedy the problem, you can copy the chart to* MacDraw *for printing (and embellishment), or get version 3.0 of the LaserWriter driver from an Apple dealer.*

developed the following technique for transferring bibliographic information to *Word*.

- Create a *File* data file structured so that each bibliographic entry is one record, with the author, title, city, publisher, and date information in separate fields. As you store each entry, be sure to include the appropriate punctuation and spacing after each item.
- After you enter and sort the records, choose Save Records As from the File menu and specify the Text (Microsoft Print Merge) option to create a text file of the data.
- Open the text file with *Word* and delete the field names that appear in the first line.
- Use the Change command to delete all the quotation marks that *Word* inserts in the text file. To delete the marks, leave the Change To box blank. If your bibliography includes quotation marks as part of any entry, use the Change Then Find button instead of Change All to avoid deleting a valid quotation mark.
- Using Change again, type ^t in the Find What box and leave the Change To box blank to delete the tabs that File inserts between fields.

Finally, alter the text font and style as desired. This technique seems involved, but it doesn't take *that* long, especially when you're constructing bibliographies with hundreds of entries.

Jeff Mason
Bakersfield, California

Missing the Mark

While using *Microsoft Chart* to create a line chart for printing on the LaserWriter, I ran into a quirk: the LaserWriter doesn't print data-point markers (see "Missing Markers"). I don't know whether the problem is in *Chart* or in the LaserWriter driver, but I do know of a solution: copy the chart to the Clipboard, then paste it into *MacDraw*. You'll not only get the missing markers, but you'll be able to take advantage of the superior support for fonts, styles, and patterns that *MacDraw* offers.

Carmine Zingarino
Coram, New York

The missing markers are due to a bug in the LaserWriter driver. Version 3.0 of the driver cleared up the problem. The latest version of the driver, version 3.1 at this writing, is available from Apple dealers. It still makes sense to copy charts to MacDraw, *however, to take advantage of its superior graphic talents. For more information on using* Chart *with* MacDraw, *see the May 1985* Open Window. *—Ed.*

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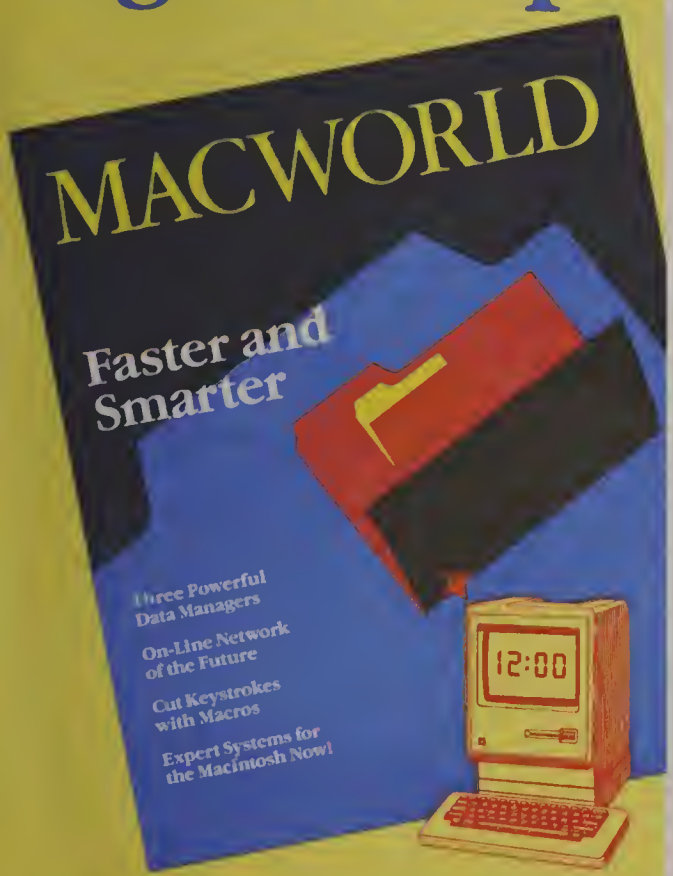

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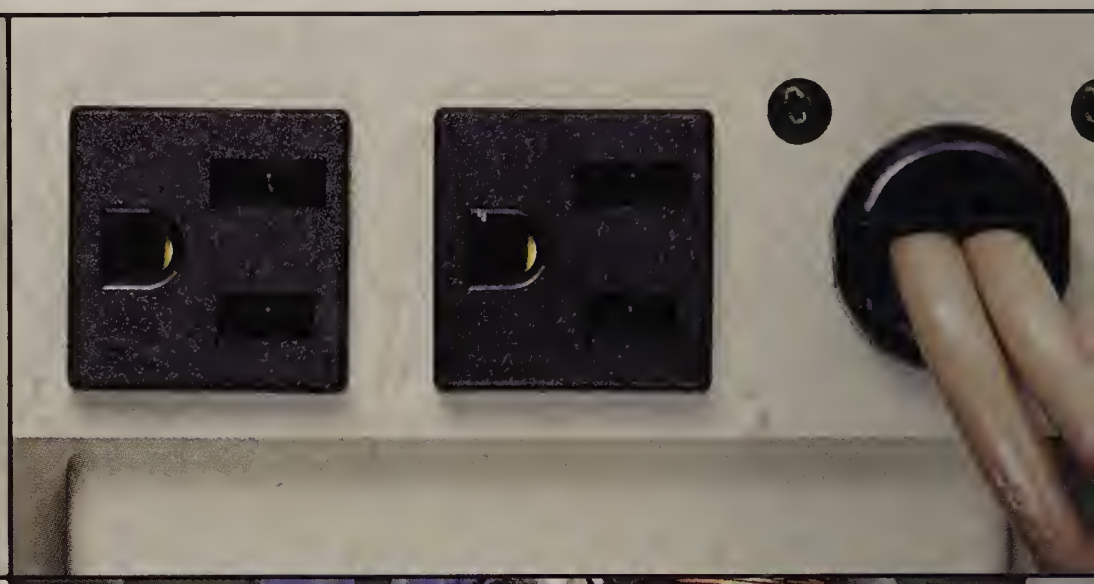
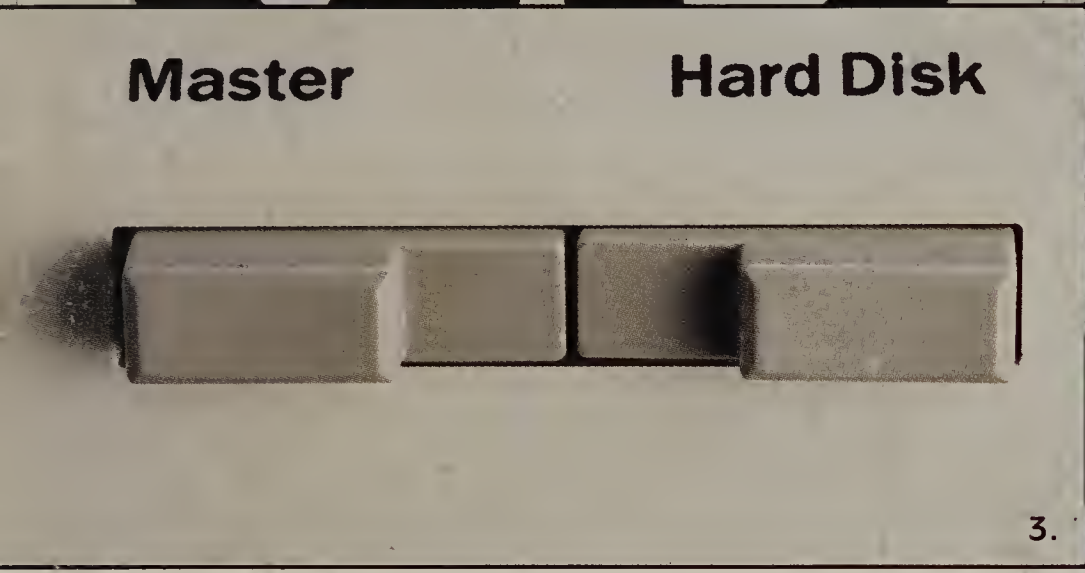
1.





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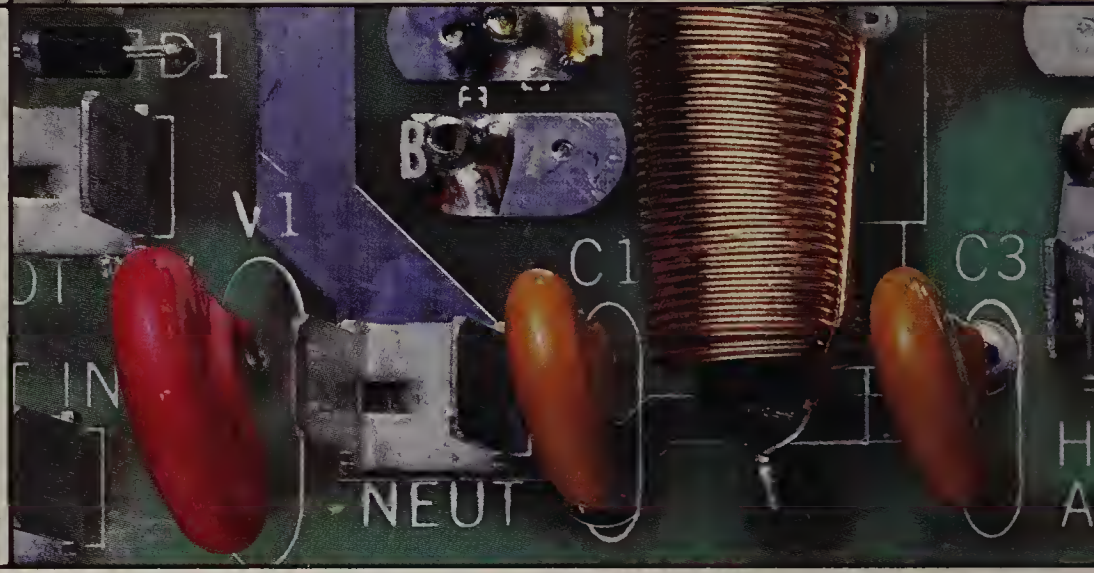

That's right – four things. In one remarkable accessory. Take a good, close look at System Saver Mac. You'll find one hard-working accessory, skillfully engineered to perform four important functions at once.

(1) System Saver Mac keeps your Macintosh cool. Its quiet fan draws cool air through your Mac at the rate of 15-18 cubic feet per minute. **(2)** System Saver Mac stops the scramble for power. It provides outlets for two peripherals (like your printer and modem), while replacing the Mac's power cord. **(3)** System Saver Mac has a single or double switch option. It comes equipped with two switches, in case you want to power one of your peripherals (like a Hard Disk 20) separately. If you'd prefer the convenience of a single switch to control your entire system, just pop off the two separate switches and pop on the special single switch cap provided. **(4)** System Saver Mac provides pure power. It protects your Macintosh, clipping surges and spikes at a safe level and filtering out line noise to make your Macintosh more accurate, efficient and reliable.

Now, isn't that just the kind of remarkable product you've come to expect from Kensington? System Saver Mac, $99.95, is available at Apple dealers everywhere. For the dealer nearest you, or for a free brochure of all Kensington's Apple accessories, call toll-free 800-535-4242. In NY, 212-475-5200.

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Circle 11 on reader service card

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